



# DB2 Data Sync

## User's guide

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# 1 Welcome to DB2 Data Sync

**DB2 Data Sync** is a powerful tool for comparison of database contents and difference synchronization. It allows you to compare data within two DB2 databases, determine differences, and generate SQL scripts to be applied to your target database.

**Key features:**

- Comparing and synchronizing database contents
- Automatic creation of error-free synchronization scripts
- Easy-to-read difference display
- Saving all options to a project file for instant re-execution
- Custom comparison keys and flexible auto-mapping tools
- Full control over the comparison and synchronization
- Powerful command-line interface for continuous integration

## 1.1 System Requirements

### Client environment

- Pentium PC or higher;
- Windows NT4/2000/XP/Vista/Windows 7/Windows 8/Windows 10/Windows 11;
- 512 MB RAM (1 GB recommended);
- 25 MB of free hard disk space;
- SVGA-compatible video adapter;
- any DB2 client.

### Server environment

- DB2 8.x-10.x.

## 1.2 Installation

To install **DB2 Data Sync** on your PC:

- download the DB2 Data Sync distribution package from the [download page](#) at our site;
- run setup.exe from the local folder and follow the instructions of the installation wizard;
- find the DB2 Data Sync shortcut in the corresponding program group of the Windows Start menu after the installation is completed.

## 1.3 How can I purchase DB2 Data Sync?

Thank you for your interest in purchasing **DB2 Data Sync**!

You can select licensing options and register DB2 Data Sync at its [on-line order page](#). It is possible to purchase on-line, by fax, mail, toll-free phone call, or place a purchase order. We send the software activation key by email within 24 hours after completion of the order process. If you have not received the activation key within this period, please contact our [sales department](#).

All our products and bundles are shipped with 12 months of free upgrades (minor and major ones) or with 36 months of free upgrades for a quite small additional fee. After this period you may renew your license for the next 12(36) months with a 50% discount.

DB2 Data Sync has a free 15-day trial. Upon purchasing the product you confirm that you have tested it and you are completely satisfied with its current version.

To obtain technical support, please visit the [appropriate section](#) on our website or contact us by email to [support@sqlmaestro.com](mailto:support@sqlmaestro.com).

## 1.4 License Agreement

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## 1.5 About SQL Maestro Group

**SQL Maestro Group** is a privately-held company producing high-quality software for database administrators and developers. The united team of eminently qualified developers is pleased to create new software products for commercial, academic and government customers worldwide. We do our best to design and develop products that remove complexity, improve productivity, compress time frames, and increase database performance and availability. We are glad to realize that our products take usual chores upon themselves, so that our customers could have more time left for their creative work.

The company was founded in 2002 as an essential partner for every business that is trying to harness the explosive growth in corporate data. SQL Maestro Group employs an international team concentrating their efforts on cutting-edge DBA tools development.

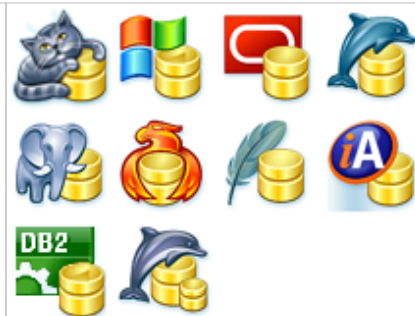
The slogan of our company is **The Shortest Path to SQL**. It is aimed to denote that we set to create easy-to-use products meant for those who appreciate comfort, friendly program interface and support when working with SQL servers.

- We are pleased to facilitate your job.
- We aim at being of considerable assistance to our clients.
- We feel contented doing our beloved work.

At present, our company offers a series of Windows GUI admin tools for SQL management, control and development of the following servers: **MySQL, Microsoft SQL Server, PostgreSQL, Oracle, SQL Anywhere, DB2, SQLite, Firebird, and MaxDB**. We also produce universal tools to be used for administering any database engine accessible via ODBC driver or OLE DB provider. Such products may be the clear-cut decision for those who constantly work with several database servers.

**SQL Maestro** is the premier Windows GUI admin tool for database development, management, and control.

It provides you with the ability to perform all the necessary database operations such as creating, editing, copying, extracting and dropping database objects; moreover, you can build queries visually, execute queries and SQL scripts, view and edit data including BLOBs, represent data as diagrams, export and import data to/from most popular file formats, manage users and their privileges (if possible), and use a lot of other tools designed for making your work with your server comfortable and efficient.



**SQL PHP Generator** is a powerful tool for creating database-driven web applications visually. It allows you to generate high-quality PHP scripts for working with tables, views and queries through the web. You needn't have any programming background to use it.



**SQL Data Wizard** is a high-capacity Windows GUI utility for managing your data.

It provides you with a number of easy-to-use wizards for performing the required data manipulation easily and quickly. The tool allows you to export data from DB2 tables and queries to most popular formats, import data into the tables, generate SQL dump of selected tables, and export/import BLOB fields from/to files.



**SQL Code Factory** is a premier GUI tool aimed at the SQL queries and scripts development.

It allows you to manage SQL queries and scripts using such useful features as code folding, code completion and syntax highlighting, build query visually, execute several queries at a time, execute scripts from files, view and edit result data with filtering, sorting and grouping abilities, export data to as many as 14 file formats including Excel, RTF and HTML, import data from Excel, CSV, XML and text files, view and edit BLOBs in various way, build diagrams based on Oracle data, and much more.



**Database Converter** is a user friendly tool to migrate any local or remote ADO-compatible database to DB2.

Such tools transfer database schema and data and are equipped with native support for the most popular database servers.



**Data Sync** is a powerful and easy-to-use tool for database contents comparison and synchronization.

Such tools can be useful for database administrators, developers and testers that need a quick, easy and reliable way to compare and synchronize their data.



The software products are constantly optimized for the latest server versions support.

You can use the following contact information if necessary:

Our web-site [www.sqlmaestro.com](http://www.sqlmaestro.com)

Postal address: **SQL Maestro Group**  
140 Broadway, Suite 706  
New York City, New York 10005  
United States

**Thank you for your interest to our company!**

## 1.6 What's new

Please find out the latest DB2 Data Sync news at <http://www.sqlmaestro.com/products/db2/datasync/news/>

## 2 Getting started

To compare and synchronize,

- set connection parameters of the [source database](#)<sup>[12]</sup> and the [target one](#)<sup>[26]</sup>;
- [select target tables and views to compare data](#)<sup>[30]</sup>;
- [map source tables to the selected ones](#)<sup>[31]</sup>;
- [view data differences and set the differences to be synchronized](#)<sup>[33]</sup>;
- and [specify additional synchronization options](#)<sup>[37]</sup>.

DB2 Data Sync allows you to save and restore all the options set during a session. You need not to specify all options each time you work with the application anew; instead you can load all settings from a project and change them if necessary. When working with a project, all the session parameters are loaded from a project file and may be edited if necessary. To run a wizard with a project, follow [More... > Load Project](#) on the first wizard step and enter the name of the project file, recently used projects are also available from this popup menu. Find out more about working with [Projects](#)<sup>[27]</sup>.

## 2.1 Connecting to the source data

DB2 Data Sync compares the **source** database and the **target** one after the comparison prepares a synchronization script to be executed on the target database. To compare tables stored in one database, specify the connection properties once and use the Copy credentials button to [copy source to target](#) or vice versa.

The databases that are being compared by DB2 Data Sync can be driven by two different SQL servers. To specify connection options of the source database, select the appropriate DBMS and set corresponding parameters. These topics provides you with detailed descriptions of such parameters related to specific servers.

- [MySQL](#) <sup>12</sup>,
- [PostgreSQL](#) <sup>15</sup>,
- [Firebird](#) <sup>19</sup>,
- [MS SQL Server](#) <sup>18</sup>,
- [SQLite](#) <sup>22</sup>,
- [Oracle](#) <sup>22</sup>,
- [MaxDB](#) <sup>24</sup> and
- [SQL Anywhere](#) <sup>24</sup>.

### 2.1.1 MySQL

Specify the following credentials to connect to MySQL.

- **Direct connection**

It is the most natural and the most preferable connection mode. Use it each time it is possible. Most of hosting companies allow direct connections to databases. However in most cases you have to go to your control panel and add your home/office computer IP address or domain name to the Access List - list of IP addresses allowed accessing from outside. [More information.](#)

- **SSH tunnel connection**

If your DB2 server does not allow direct connections from your remote workstations, you can establish connection to an allowed intermediate SSH server and forward all MySQL commands through the [Secure SHell \(SSH\) tunnel](#).

- **HTTP tunnel connection**

[HTTP tunneling](#) is a technique used in conditions of restricted network connectivity including firewalled networks, networks behind proxy servers, and NATs. It is the slowest way and is recommended to use if the others are impossible.

Irrespectively of a connection mode you should specify common credentials as follows:

**Host**

The host name of the MySQL server.

**Port number**

The TCP/IP port to use (default MySQL port is 3306).

#### User name

The username used to connect to MySQL.

#### Password

The password for the user account on server.

#### Allow old style password

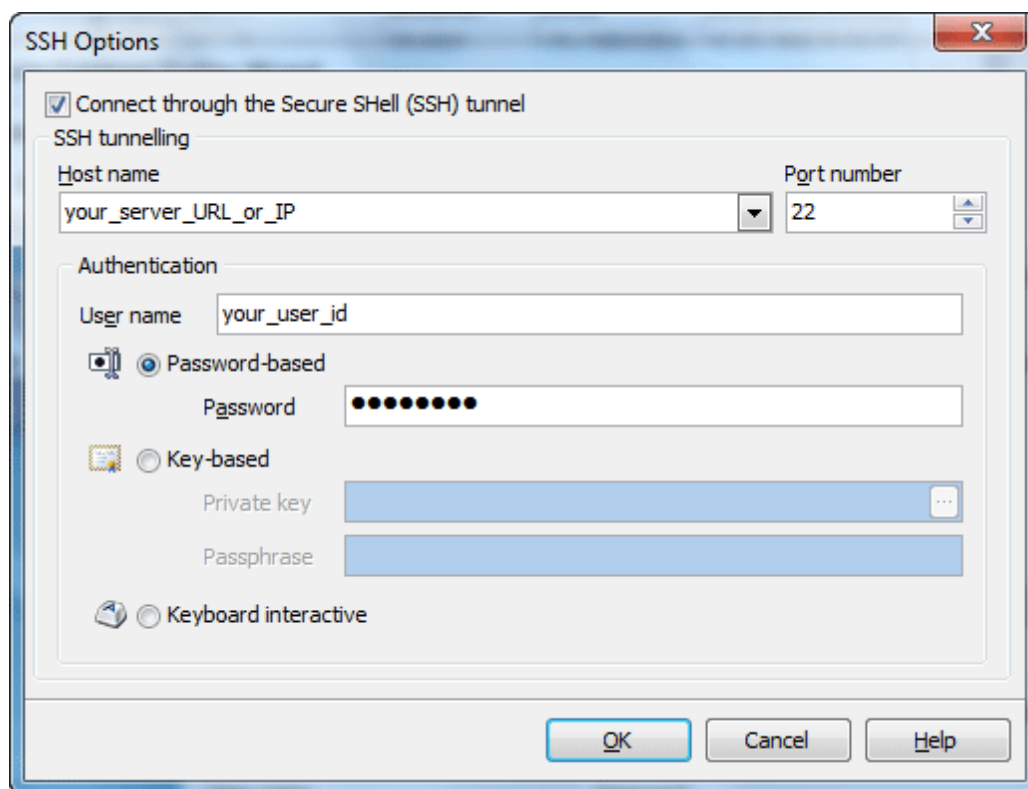
Turn this option ON only if your MySQL server still uses 16 bytes long password hashes.

[More information](#).

### More about SSH tunnel connection

To establish connection to intermediate SSH server and forward all DB2 commands through the secure tunnel, you need to:

1. Check [I can connect to the server directly or via SSH tunneling](#).
2. Follow the [Configure SSH options](#) link to open the SSH Options window.



3. Check [Connect through the Secure Shell \(SSH\) tunnel](#) and complete the following fields:

#### Host name

Specify the host name or IP of your site. Note, that DB2 host name always should be set relatively to the SSH server. For example, if both of DB2 and SSH servers are located on the same computer, you should specify localhost



as Host name instead of server's external host name or IP address.

#### Port number

Enter the port number for the SSH server.

4. Enter valid [User name](#) for the remote server and select the [Authentication](#) method and set corresponding credentials.

#### Password-based

Set the [password](#) corresponding to the specified user.

#### Key-based

Specify the path to the [Private key](#) file with the corresponding [Passphrase](#) to log in to the remote server. DB2 Data Sync accepts keys in **ssh.com** or **OpenSSH** formats. To convert a private key from PuTTY's format to one of the formats supported by our software, [use the PuTTYgen utility](#) that can be freely downloaded from the [PuTTY website](#).

#### Keyboard interactive

Keyboard authentication is the advanced form of password authentication, aimed specifically at the human operator as a client. During keyboard authentication zero or more prompts (questions) is presented to the user. The user should give the answer to each prompt (question). The number and contents of the questions are virtually not limited, so certain types of automated logins are also possible.

### More about connection via HTTP tunnel

To connect to a remote server using an HTTP tunnel, you need to:

1. Upload the connection PHP script to your website. The installation folder, usually `C:\Program Files\SQL Maestro Group\DB2 Data Sync`, contains two scripts: `mysqli_tunnel.php` and `mysql_tunnel.php`. We would recommend you to **use the `mysqli_tunnel.php` script always if possible** as it operates through the [MySQLi PHP extension](#) (available since PHP 5) while `mysql_tunnel.php` uses the [original MySQL PHP API](#) that is deprecated as of PHP 5.5.
2. Select the [I have to use HTTP tunneling](#) radio button.
3. Enter the connection PHP script URL, e.g. `www.yoursite.com/files/sqlite_tunnel.php`. You can test the connection before the profile is created. Just use [Test script using default browser](#) to open connection script in your browser, enter all the required connection parameters and click the [Test connection](#) button.

## Connection Script

Fields marked by \* are required.

Host/Server name (or IP) *:	<input type="text" value="localhost"/>
User *:	<input type="text" value="root"/>
Password:	<input type="text" value="mypass"/>
Port (if not 3306):	<input type="text"/>
Database *:	<input type="text" value="mydb"/>
	<input type="button" value="Get Database List"/>
	<input type="button" value="Test Connection"/>
	<input type="button" value="ShowTables"/>

4. In case using of a proxy server use [Configure tunnelling](#) options to open the [HTTP tunnelling options](#) window and specify your [proxy server](#) connection parameters and [HTTP authentication](#).

**Note:** You are actually connecting to your database through the PHP script on the server, so in most cases the host/server name is "localhost" unless the target database server is not installed on the same computer as the Web server.

### 2.1.2 PostgreSQL

Specify the following credentials to connect to PostgreSQL.

- **Direct connection**

It is the most natural and the most preferable connection mode. Use it each time it is possible.

- **SSH tunnel connection**

If your PostgreSQL server does not allow direct connections from your remote workstations, you can establish connection to an allowed intermediate SSH server and forward all PostgreSQL commands through the [Secure SHell \(SSH\) tunnel](#).

- **HTTP tunnel connection**

[HTTP tunneling](#) is a technique used in conditions of restricted network connectivity including firewalled networks, networks behind proxy servers, and NATs. It is the slowest way and is recommended to use if the others are impossible.

Irrespectively of a connection mode you should specify common credentials as follows:

**Host**

The host name of the PostgreSQL server.

**Port number**

The TCP/IP port to use. Default PostgreSQL port is 5432.

### [User name](#)

The username used to connect to PostgreSQL.

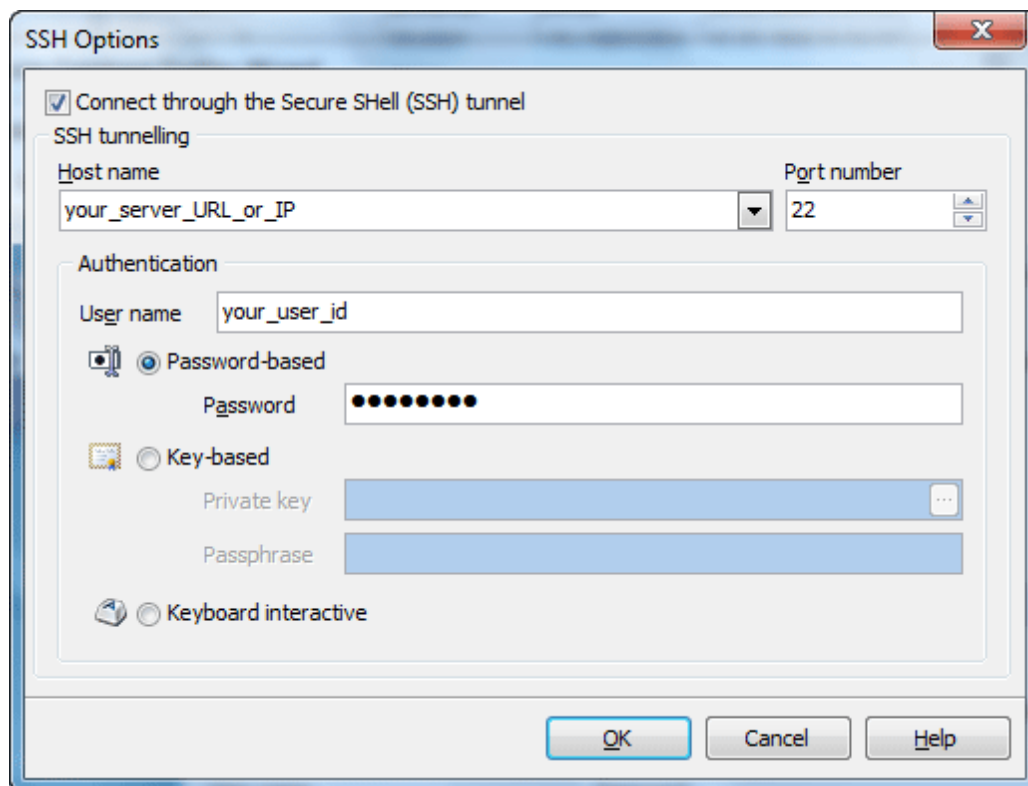
### [Password](#)

The password for the user account on server.

## **More about SSH tunnel connection**

To establish connection to intermediate SSH server and forward all DB2 commands through the secure tunnel, you need to:

1. Check [I can connect to the server directly or via SSH tunneling](#).
2. Follow the [Configure SSH options](#) link to open the SSH Options window.



3. Check [Connect through the Secure Shell \(SSH\) tunnel](#) and complete the following fields:

### [Host name](#)

Specify the host name or IP of your site. Note, that DB2 host name always should be set relatively to the SSH server. For example, if both of DB2 and SSH servers are located on the same computer, you should specify localhost as Host name instead of server's external host name or IP address.

### [Port number](#)

Enter the port number for the SSH server.

4. Enter valid [User name](#) for the remote server and select the [Authentication](#) method and set corresponding credentials.

#### Password-based

Set the [password](#) corresponding to the specified user.

#### Key-based

Specify the path to the [Private key](#) file with the corresponding [Passphrase](#) to log in to the remote server. DB2 Data Sync accepts keys in **ssh.com** or **OpenSSH** formats. To convert a private key from PuTTY's format to one of the formats supported by our software, [use the PuTTYgen utility](#) that can be freely downloaded from the [PuTTY website](#).

#### Keyboard interactive

Keyboard authentication is the advanced form of password authentication, aimed specifically at the human operator as a client. During keyboard authentication zero or more prompts (questions) is presented to the user. The user should give the answer to each prompt (question). The number and contents of the questions are virtually not limited, so certain types of automated logins are also possible.

### **More about connection via HTTP tunnel**

To connect to a remote server using an HTTP tunnel, you need to:

1. Upload the connection PHP script to your website. The script is named *sqlite\_tunnel.php* and can be found under the installation folder, usually *C:\Program Files\SQL Maestro Group\DB2 Data Sync*.
2. Select the [I have to use HTTP tunneling](#) radio button.
3. Enter the connection PHP script URL, e.g. *www.yoursite.com/files/sqlite\_tunnel.php*. You can test the connection before the profile is created. Just use [Test script using default browser](#) to open connection script in your browser, enter all the required connection parameters and click the [Test connection](#) button.

## Connection Script

Fields marked by \* are required.

Host/Server name (or IP) *:	<input type="text" value="neptun"/>
User *:	<input type="text" value="postgres"/>
Password:	<input type="password" value="••••••••"/>
Port (if not 5432):	<input type="text" value="5433"/>
Database *:	<input type="text" value="adventure"/> <input type="button" value="v"/> <input type="button" value="Get Database List"/>
<input type="button" value="Test Connection"/> <input type="button" value="ShowTables"/>	

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4. In case using of a proxy server use [Configure tunnelling options](#) to open the [HTTP tunnelling options](#) window and specify your [proxy server](#) connection parameters and [HTTP authentication](#).

**Note:** You are actually connecting to your database through the PHP script on the server, so in most cases the host/server name is "localhost" unless the target database server is not installed on the same computer as the Web server.

### 2.1.3 MS SQL Server

Specify the following credentials to connect to Microsoft SQL Server.

#### Server

The full name of SQL Server you want to connect to. Can be specified as *computer\_name* (for default SQL Server instances) or as *computer\_name\server\_name* (for named instances). To connect to an SQL Server running on a non-default port, specify the value of this field as *computer\_name,port\_number* (or *computer\_name\server\_name, port\_number*). Press the arrow button to scan for SQL Servers accessible in your network.

#### Provider

The application allows you to connect to SQL Server using any of SQL Server clients installed on your computer. To choose a client you want to use, select the appropriate item in the Provider combobox. The table below shows the correspondence between the value selected in this combobox and SQL Server client to be used.

Value	SQL Server client	Introduced with

SQLOLE DB	Microsoft OLE DB Provider for SQL Server (default value)	Comes with Windows
SQLNCLI	<a href="#">SQL Server Native Client</a>	SQL Server 2005
SQLNCLI10	<a href="#">SQL Server 2008 [R2] Native Client</a>	SQL Server 2008 [R2]
SQLNCLI11	<a href="#">SQL Server 2012 Native Client</a> (recommended)	SQL Server 2012

We would recommend you to install and use **SQL Server 2012 Native Client** as it (and only it) supports [SQL Server Express LocalDB](#). Also it provides the best support for data types implemented in the recent versions of SQL Server.

[Windows Authentication](#) (more preferable)

Microsoft Windows Authentication mode allows a user to connect through a Windows user account.

[SQL Server Authentication](#)

When a user connects with a specified [Login name](#) and [Password](#) from a non-trusted connection, SQL Server performs the authentication itself by checking to see if a SQL Server login account has been set up and if the specified password matches the one previously recorded.

## 2.1.4 Firebird

Specify the following credentials to connect to Firebird.

- **Direct connection**

Direct connection is the most preferable connection mode.

- **SSH tunnel connection**

If your Firebird server does not allow direct connections from remote workstations, you can establish connection to intermediate SSH server and forward all Firebird commands through the [Secure SHell \(SSH\) tunnel](#).

Irrespectively of a connection mode you should specify common credentials as follows:

[Protocol](#)

Select "Standard server" to connect to a local or remote standalone Firebird server or "Embedded server 2.5-" / "Embedded server 3.0+" to use the embedded Firebird servers that come with the software (2.5 and 3.0 accordingly).

[Host](#)

The name of machine the Firebird server and database file resides on. It is usually possible to specify TCP/IP address instead of name (like 192.168.12.34), however this functionality is not built into Firebird, instead, it is provided by underlying network layer (e.g. WinSock2), and for some implementations/configurations it can be much slower than using name. In case the server is not localhost, specify the TCP/IP port as [Port number](#).

[Login information](#)

Since Firebird 2.1, Windows authentication has been used for configuring the server

authentication mode along with the traditional login info, requiring users to log in using a user name and password defined in the security database. To use [Windows authentication](#), check the corresponding box. Under the right conditions, this may be the most secure way to authenticate on Windows. Otherwise, set the following server security options:

**User name** The username used to connect to Firebird. User names are case insensitive on the server.

**Password** The password for the user account on server. The server checks the user name and password against the security database. Case sensitivity is retained for the comparison. Only first 8 characters of Password are verified.

**Role** Specify the role that the user adopts on connection to the database or leave it blank. Regardless of role memberships granted, the user has the privileges of a role at connect time only if a [Role](#) clause is specified in the connection. The user must have previously been granted membership in the role to gain the privileges of that role.

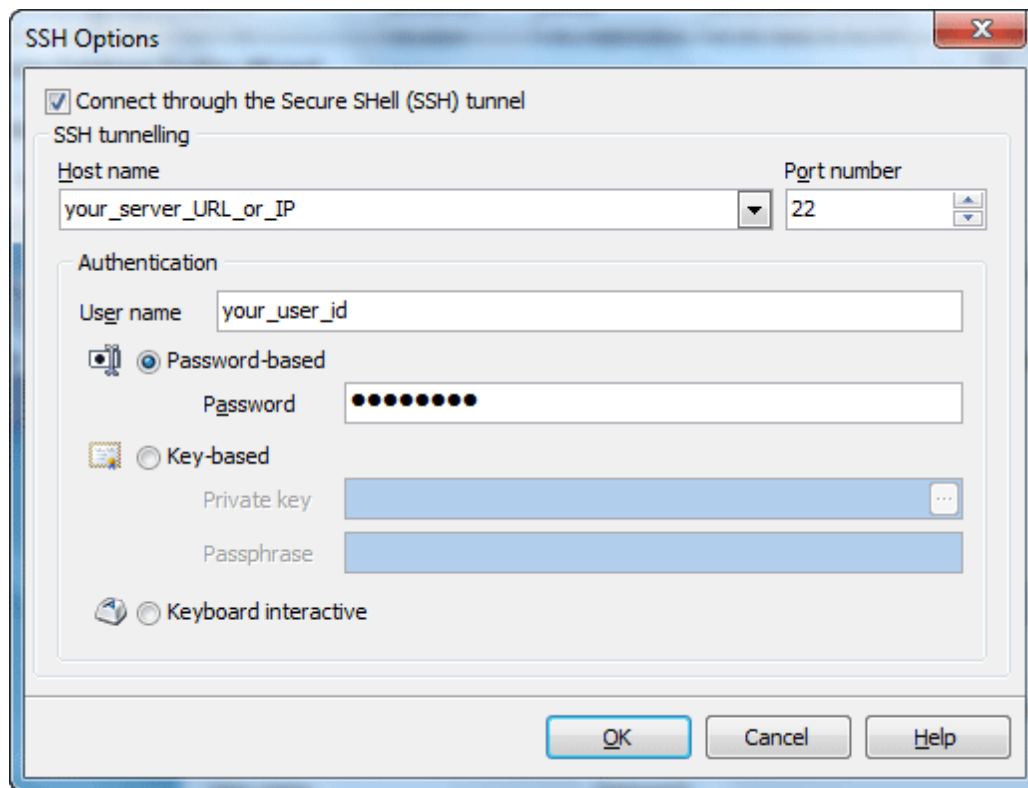
#### [Database name](#)

This is either a full name of the database file (as seen from the server), or an alias defined in the server's [aliases.conf](#) file.

#### **More about SSH tunnel connection**

To establish connection to intermediate SSH server and forward all DB2 commands through the secure tunnel, you need to:

1. Check [I can connect to the server directly or via SSH tunneling](#).
2. Follow the [Configure SSH options](#) link to open the [SSH Options](#) window.



3. Check [Connect through the Secure Shell \(SSH\) tunnel](#) and complete the following fields:

#### Host name

Specify the host name or IP of your site. Note, that DB2 host name always should be set relatively to the SSH server. For example, if both of DB2 and SSH servers are located on the same computer, you should specify localhost as Host name instead of server's external host name or IP address.

#### Port number

Enter the port number for the SSH server.

4. Enter valid [User name](#) for the remote server and select the [Authentication](#) method and set corresponding credentials.

#### Password-based

Set the [password](#) corresponding to the specified user.

#### Key-based

Specify the path to the [Private key](#) file with the corresponding [Passphrase](#) to log in to the remote server. DB2 Data Sync accepts keys in **ssh.com** or **OpenSSH** formats. To convert a private key from PuTTY's format to one of the formats supported by our software, [use the PuTTYgen utility](#) that can be freely downloaded from the [PuTTY website](#).

#### Keyboard interactive

Keyboard authentication is the advanced form of password authentication,



aimed specifically at the human operator as a client. During keyboard authentication zero or more prompts (questions) is presented to the user. The user should give the answer to each prompt (question). The number and contents of the questions are virtually not limited, so certain types of automated logins are also possible.

### 2.1.5 Oracle

To connect to an Oracle database with DB2 Data Sync, specify the following connection options.

#### User name

Use the field to specify the username to be used to connect to Oracle.

#### Password

Enter the password for the user account on server.

#### Database name

An entry from [TNSNames.ora](#).

#### Connect mode

Allows you to connect with required administrative privileges (SYSDBA or SYSOPER). [More information](#).

Check [Use Operating system authentication](#) to allow Oracle to pass control of user authentication to the operating system. The technology works as follows:

- First, create an OS user (if it doesn't exist).
- Check a value of the Oracle `OS_AUTHENT_PREFIX` initialization parameter. Current value of this parameter can be retrieved using the following query:

```
SELECT VALUE FROM V$PARAMETER  
WHERE NAME = 'os_authent_prefix'
```

The default value is OPS\$. The initialization parameter can be modified with the ALTER SYSTEM command.

- Create a database user. The user must use the external identification and its name must be the prefix value concatenated to the OS username (on Windows platforms you would expect an Oracle username of "OPS\$DOMAIN\MY\_USER" for the user "my\_user").

### 2.1.6 SQLite

As SQLite is implemented as an embedded database engine contained in a single DLL, SQLite databases usually are stored locally or in the shared folders. To connect to such database, you should provide only a full database file name (e.g. C:\Data\SQLite\MyDatabase.db3) and a password (only for encrypted databases).

To read and write encrypted databases, DB2 Data Sync uses the free [wxSQLite3 library](#) that is included into the installation package. This means it can operate only with encrypted databases created by itself or by any other tool that uses the same library. Unfortunately, our software cannot connect to databases encrypted by any other library

because different SQLite security extensions use different algorithms, which are not compatible with each other.

SQLite engine does not support network connections, however DB2 Data Sync allows you to manage remote SQLite databases using the HTTP tunneling technique. For this purpose, you need to have a webserver running on a computer that stores the database file. Of course this webserver should be accessible from your workstation and you should be able to upload files there.

#### More about connection via HTTP tunnel

To connect to a remote SQLite database using an HTTP tunnel, you need to:

1. Upload the connection PHP script to your website. The scripts are named *sqlite\_tunnel.php* and *sqlite3\_tunnel.php* for SQLite databases versions 2 and 3 accordingly and can be found under the installation folder, usually *C:\Program Files\SQL Maestro Group\DB2 Data Sync*.
2. Turn ON the [I have to use HTTP tunneling](#) checkbox.
3. Enter the connection PHP script URL, e.g. *www.yoursite.com/files/sqlite\_tunnel.php*. You can test the connection before the profile is created. Just use [Test script](#) using default browser to open connection script in your browser, enter all the required connection parameters and use the [Test connection](#) button.

### Connection Script

Fields marked by \* are required.

Database *:	<input type="text" value="ATP_Tennis.db3"/>
<div><div>Test Connection</div><div>Show Tables</div></div>	
<b>Table List</b>	
COUNTRIES	
PLAYERS	
PLAYERSINTOUR	
SURFACETYPE	
TOURS	
TOURSType	

4. In case using of a proxy server use [Configure tunnelling options](#) to open the [HTTP tunnelling options](#) window and specify your [proxy server](#) connection parameters and [HTTP authentication](#).

**Note 1.** Do not forget to enable read/write permissions for a database file and read/write/execute permissions for the directory where the database file is stored.

**Note 2** (only for SQLite 3 databases). The webserver PDO\_SQLite library must be compatible (not earlier in the most cases) with the library the database was created with. If they are not compatible, you will get an error message "Could not retrieve table list from \_database\_name\_ ..." on getting a table list at the connection script. If you've got the message, check the PDO\_SQLite library version using, for example, the *phpinfo()* function, download a compatible library from the [SQLite official website](#), get an SQL dump of the database and create a new one from the dump file with this library.

## 2.1.7 MaxDB

Specify the following credentials to connect to MaxDB.

### Host

The host name of the MaxDB server.

### Driver

You can use any ODBC driver to connect to a MaxDB database with our software. The drop-down list contains all drivers installed on your computer which names include the 'Sap' or 'MaxDB'. To use another driver, enter its name manually. This name must conform to the following connection string:

```
Extended      Properties="UID=your_user_uid;PWD=your_password;SERVERDB=your_database;  
              SERVERNODE=your_host;DRIVER={driver_name};"
```

### User name

The username used to connect to MaxDB.

### Password

The password for the user account on server.

## 2.1.8 SQL Anywhere

To connect to an SQL Anywhere database with DB2 Data Sync, specify the following connection options:

### Host

The host name of the SQL Anywhere server.

### Engine name

The name of a running database server to which you want to connect. Click the ellipsis button to scan your network for available SQL Anywhere servers.

### Port number

The TCP/IP port to use (default value is 2638).

DB2 Data Sync allows you to [use integrated login](#) (only for database servers running on Windows). Otherwise, set the following server security options.

### User name

The username used to connect to SQL Anywhere.

### Password

The password for the user account on server.

**Start database before connection**

Starts a local database server (if available).

**Stop database after last disconnect**

Stops local database server when there are no more open non-HTTP connections.

## 2.2 Connecting to the target database

To setup a connection to a DB2 database stored on a remote server, you need:

1. Get any DB2 client with ODBC driver installed on your computer. We recommend to use clients with the DB2 Command Line Processor (CLP) tool. It seems that IBM Data Server Runtime Client is the best solution in this situation. It is free and is not overloaded with various drivers. To obtain this client, visit the [publisher's site](#) and download *IBM Data Server Runtime Client (Windows 32-bit AMD and Intel x86)*.

2. Get this database catalogued by db2 on the client machine. The DB2 client can work only with catalogued databases assumed with cataloged nodes (servers). To work with a DB2 database with DB2 Data Sync, you have to get this database catalogued on the client machine (the operation is accomplished only once) and to specify the *name of user* registered on DB2 server and the corresponding *password*. To catalogue a DB2 database, follow the steps below:

2.1 Catalog the node of server. To get all the catalogued nodes of the client machine, enter the following command to the DB2 Command Window or similar (It's time to use DB2 Command Line Processor ;) ):

```
db2 list node directory
```

To catalog a new server node, use the following command:

```
db2 catalog tcpip node <nodename> remote <hostname or ip address>
server <db2servicename> [remote <instance_name> ostype <OSname>]
```

nodename – the node name to be used on your computer

hostname or ip address – hostname/ipaddress of server storing the DB2 database

db2servicename – ServiceName or port number of db2instance (db2 get dbm cfg | grep SVCENAME)

instance\_name – instance name of db2 database.

OSname – Solaris, windows, AIX, Linux etc.

Example:

```
db2 catalog tcpipnode testnode remote testhost server 50000
db2 catalog tcpipnode testnode remote testhost server 50000 remote db2inst1
```

2.2 Catalog the necessary database on the corresponding node. To get the list of catalogued databases, use the following command:

```
db2 list db directory
```

To add the necessary database to the catalog, enter the following command:

```
db2 catalog database <dbname> as [<db_alias>] at node <nodename>
```

dbname – database name

db\_alias – optional database alias, if you want database name different on client.

nodename – nodename you created on first step

Example:

```
db2 catalog database testdb as testdb at node testnode
db2 catalog database sample at node testnode
```

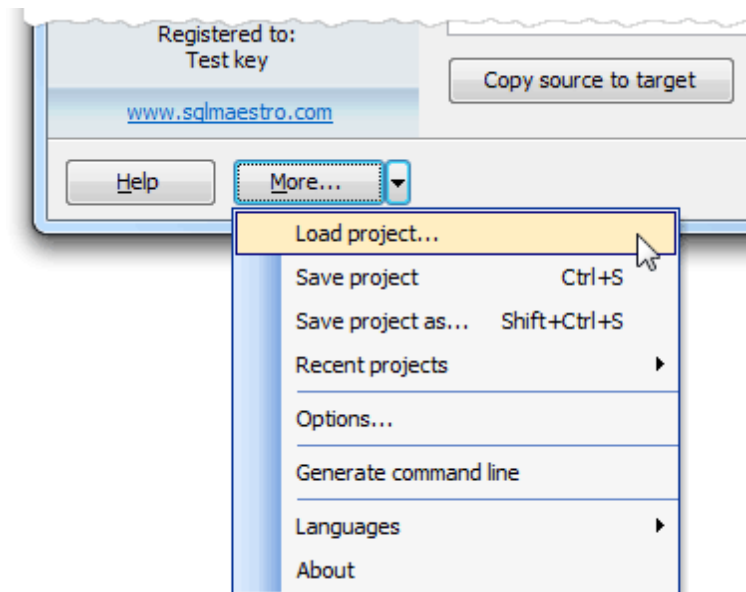
## 2.3 Projects

DB2 Data Sync allows you to save and restore all the options set during a session. You need not to specify all options each time you work with the application anew; instead you can load all settings from a project and change them if necessary.

Projects are very useful when working with DB2 Data Sync. If you will close the application without saving a project, all carefully adjusted settings will be lost. To set the same options next time, you'll need to repeat the process step by step again while with a project all the session parameters can be restored in a few mouse clicks.

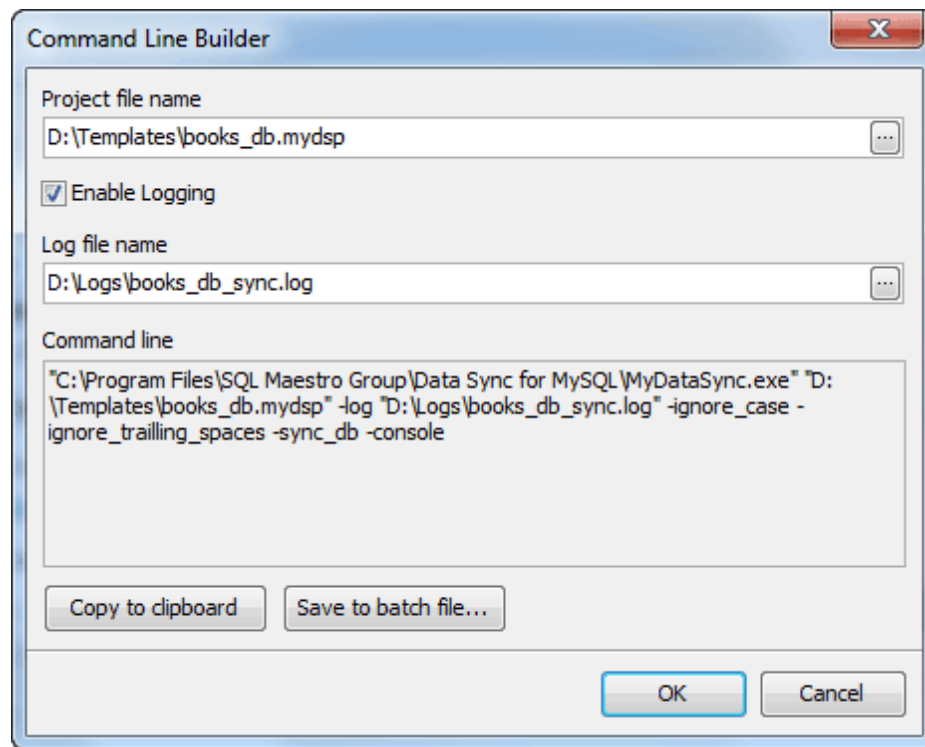
To create a project, click **More > Save Project**. All the settings you have made will be saved to a file.

To restore previously saved settings from a project, click **More > Load Project** at the first wizard step. Recently used projects are available from the **More > Recent Projects** popup menu.



## 2.4 Command line options

DB2 Data Sync supports a number of command line options that make it possible to fully automate database comparison and synchronization. To generate the command line automatically, load the project to be used or specify the comparison options and click [More > Generate command line](#). To log the synchronization process, check the corresponding option and set the [Log file name](#).




The DB2 Data Sync command line syntax is as follows:

```
MyDataSync[.exe] -sd|sync_db | -ss|sync_script  

<synchronization_script_file_name>  

<project_file_name> [-c|console] [-l|log <log_file_name>] [-ig|ignore_case]  

[-is|ignore_trailing_spaces] [-h|help] [-u|update] [-i|insert] [-d|delete]
```

MyDataSync[.exe]	The DB2 Data Sync program file.
<project_file_name>	The <a href="#">project</a>  with all the task's settings.
-c console	Runs the wizard in console mode. This option is required.
-sd sync_db	Specifies whether the wizard have to synchronize data immediately.
-ss sync_script	Sets the wizard to save the synchronization script to a file, requires the script file name.
-l log	Enables logging, requires the log file name.
-ig ignore_case	Sets the wizard to ignore case in strings on data comparison.
-is ignore_trailing_spaces	Specifies the wizard to ignore trailing and leading spaces on data comparison.
-h help	Shows help information.

-u|update  
-i|insert  
-d|delete

Specify whether the wizard will only update target records, insert missing records into target table, or delete rows existing in the target table but not in the source one. If none of these options is specified all differences will be synchronized.

**Note:** One of **sync\_db** and **sync\_script** is required.

### Examples

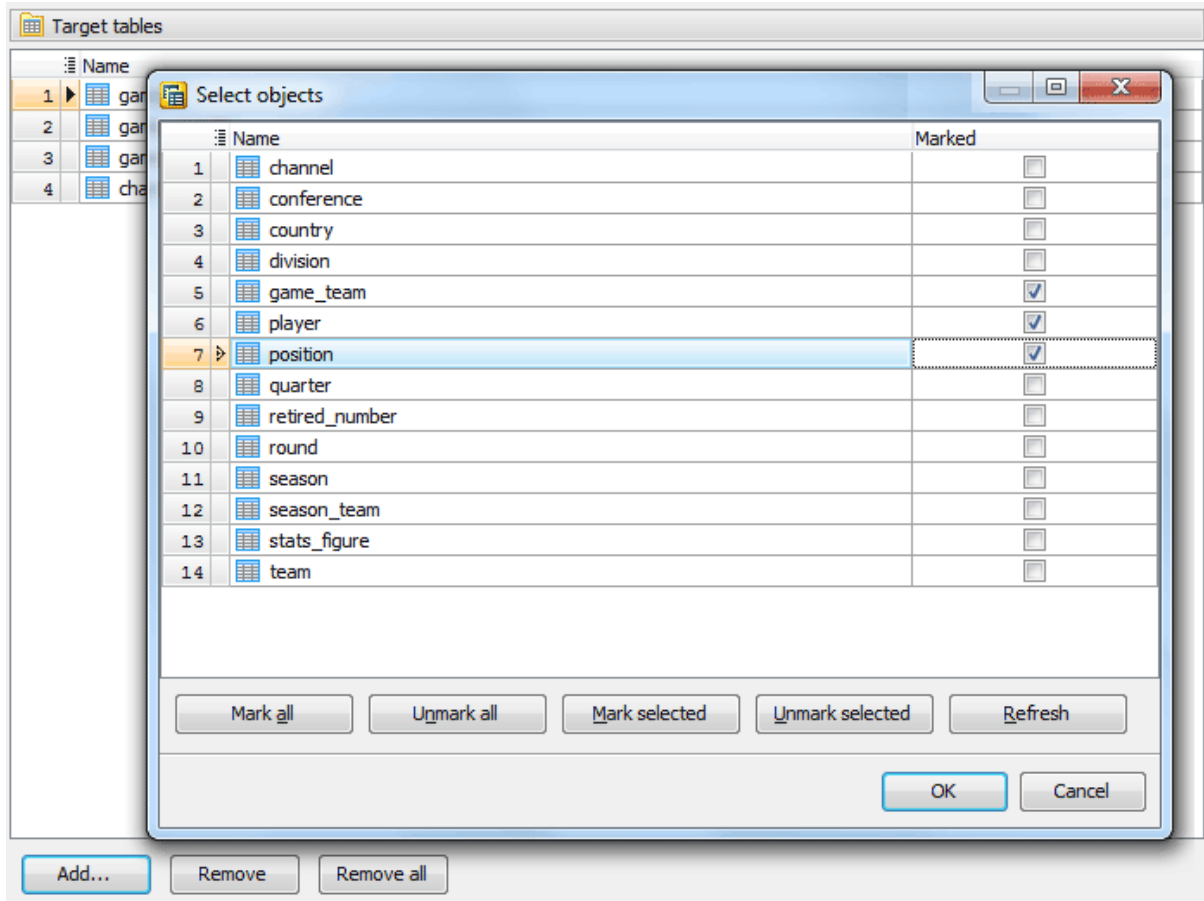
The examples below assume that you are entering the command lines in the DB2 Data Sync program directory. Don't forget to enclose all paths and filenames containing spaces in quotes.

- `"C:\Program Files\SQL Maestro Group\Data Sync for MySQL\MyDataSync.exe" "D:\Templates\mysql_dtsync_sakila.mydsp" -ignore_case -ignore_trailing_spaces -sync_db -console`
- `"C:\Program Files\SQL Maestro Group\PostgreSQL DataSync\PgDataSync.exe" "D:\Templates\postgresql_books.pgdsp" -sync_script "C:\Scripts\PostgreSQL\books_sync.sql" -console`
- `"C:\Program Files\SQL Maestro Group\Data Sync for MySQL\MyDataSync.exe" "D:\Templates\mysql_nba_upd_ins.mydsp" -sync_db -console -update -insert`



### 3 Selecting target tables and views

First you need to specify the tables and views to compare stored in the target database. These objects will be changed on data synchronization. DB2 Data Sync allows you to compare several tables and views at once. To add a table (view), click the corresponding button, and choose it within the [Select objects](#) window.

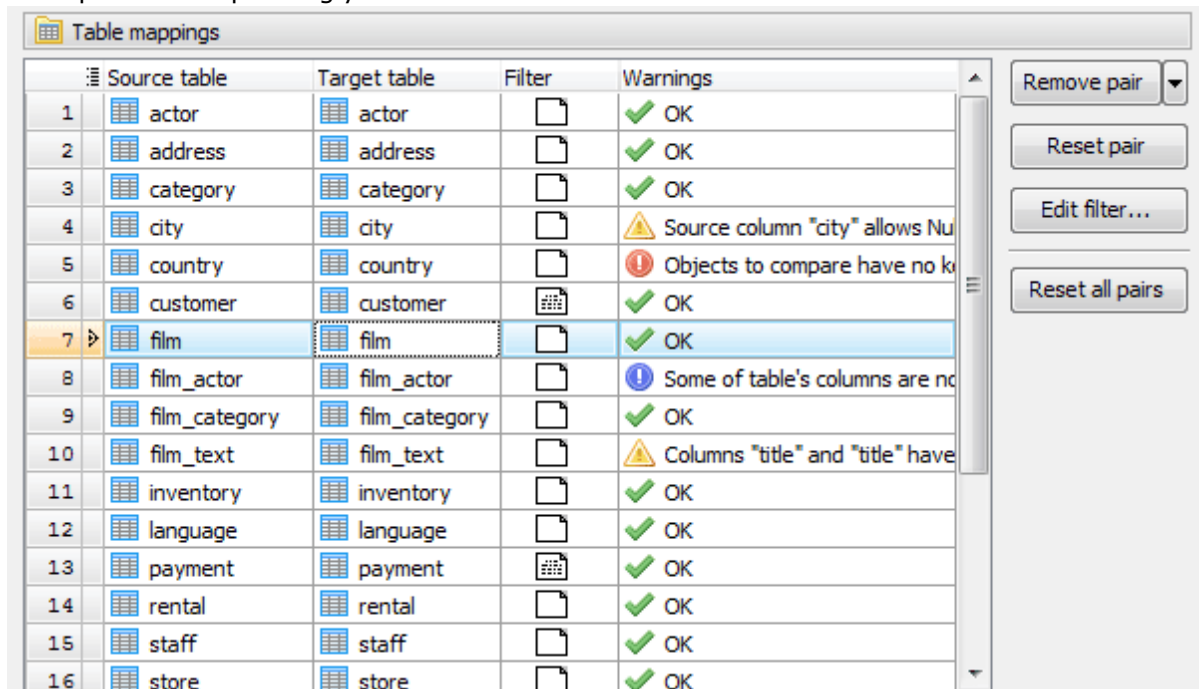


## 4 Mapping source tables to the target ones

After the objects to synchronize have been selected, it's time to set tables and views the selected objects to be compared with. DB2 Data Sync maps tables (views) and columns with the same names automatically, but you also can specify some addition rules for auto mapping of timestamp, BLOB and another format columns within the [application options](#).

### Table mapping

To map a source table manually, select it from the list of available tables. Use the [Reset pair](#) and [Reset pairs](#) buttons to restore default mappings for a selected pair or for all table pairs correspondingly.

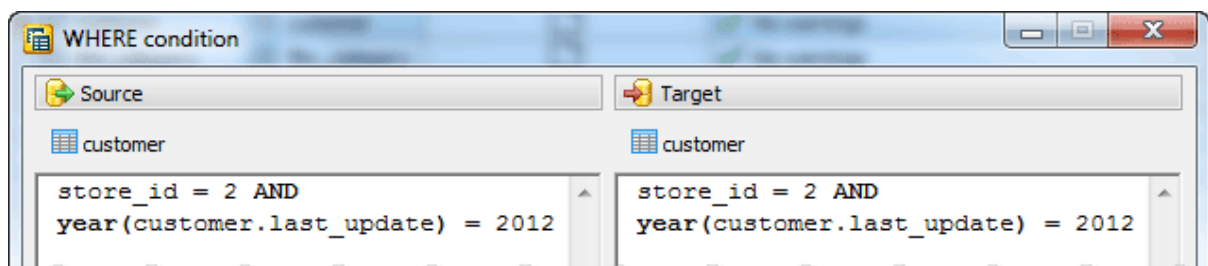


	Source table	Target table	Filter	Warnings
1	actor	actor		✓ OK
2	address	address		✓ OK
3	category	category		✓ OK
4	city	city		⚠ Source column "city" allows Nu
5	country	country		❗ Objects to compare have no k
6	customer	customer		✓ OK
7	film	film		✓ OK
8	film_actor	film_actor		❗ Some of table's columns are nc
9	film_category	film_category		✓ OK
10	film_text	film_text		⚠ Columns "title" and "title" have
11	inventory	inventory		✓ OK
12	language	language		✓ OK
13	payment	payment		✓ OK
14	rental	rental		✓ OK
15	staff	staff		✓ OK
16	store	store		✓ OK

Buttons on the right: Remove pair, Reset pair, Edit filter..., Reset all pairs.

### Filter

To reduce the volume of data to be compared, specify the WHERE condition. This condition allows to filter data and compare and synchronize only data subsets.



Source	Target
customer	customer
store_id = 2 AND year(customer.last_update) = 2012	store_id = 2 AND year(customer.last_update) = 2012

### Warnings

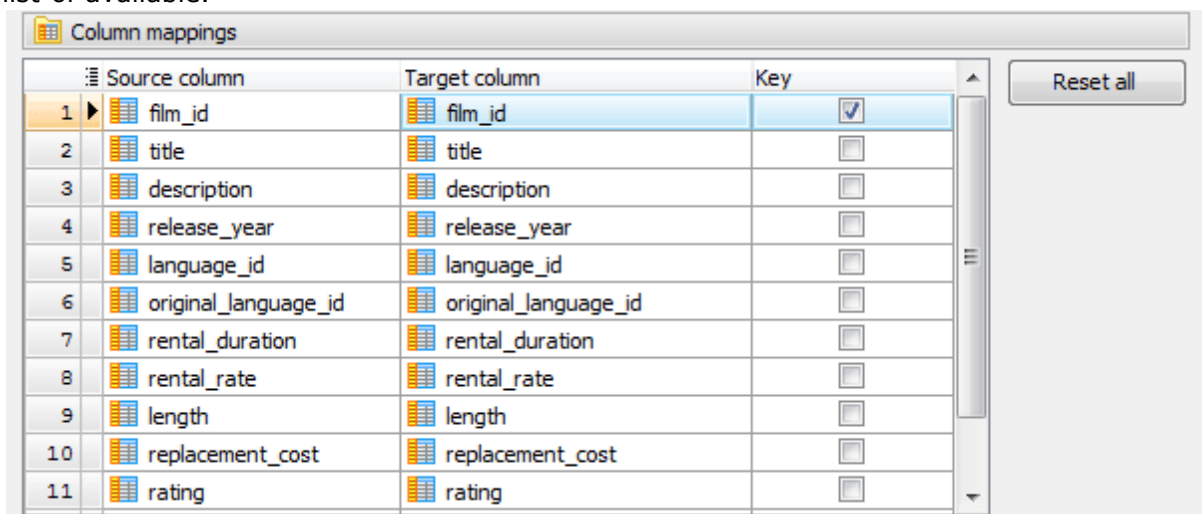
The aim of these messages is to notify you about possible faults of the coming synchronization. In case no source columns have been specified the warning message is

"No columns to compare", if the tables have no key columns and you haven't specified any column to be used to determine which rows correspond to each other the warning message is "Objects to compare have no key columns" and so on. All the warnings have their labels: red label means that the comparison of the table pair is impossible, yellow label hints that the coming migrating of data may cause truncation, and the blue one informs that several table columns are not used in the table comparison.

The [Remove pairs with critical errors](#) button allows to remove pairs those comparison with the specified mappings is impossible. The warning messages of such pairs marked by red label.

### Mapping specific columns

If you want to compare columns in a table and the column names are different, you can map the columns as required. To map a source column, select the required one from the list of available.



### Setting the comparison key

To determine which rows correspond to each other, specify the [Comparison Key](#). The Key includes columns to be identified on two rows comparison, and the differences of the rows to be compared. By default, the comparison key is set according to the table primary key, but if the primary key does not exist you have to specify it manually. In case the key is not specified the comparison of the tables is impossible.

## 5 Setting data differences to be synchronized

The [Data differences](#) view displays the results of comparison corresponding to [specified options](#)<sup>[40]</sup>. To recompose the view with another data comparison options, change necessary options and click the [Update](#), or [Update all](#) buttons.

### Comparison pairs

This pane shows compared tables with number of rows that exist in both databases but are different ([Different](#)), the number of rows that exist in the source table but not in the target one ([Source only](#)), the number of rows that exist in the target table but not in the source one ([Target only](#)). To see the total number of rows in the tables that are identical, use [the corresponding option](#)<sup>[40]</sup>.

### Comparison results

This pane displays rows storing in the selected comparison pair grouped by how they differ between the tables. All groups are optional and processed according to the [data comparison options](#)<sup>[40]</sup>.

<a href="#">Different rows</a>	Rows that exist in both databases but are not identical. The differences are highlighted.
<a href="#">Source only rows</a>	Rows that exist in the source table but not in the target one.
<a href="#">Target only rows</a>	Rows that exist in the target table but not in the source one.
<a href="#">Identical rows</a>	Rows that are exactly alike in both tables.

To include/exclude a row to/from the synchronization script, turn On/Off the [Include](#) checkbox.

**Comparison pairs**

		Tables		Row count		
	Source table	Target table	Different	Source only	Target only	
1	address	address	2	1	1	
2	actor	actor	1	0	0	
3	customer	customer	12	0	4	
4	film	film	18	0	3	

Update  
Update all  
Export results...

---

**Comparison results**

● Different rows (12)
● Source only rows (0)
● Target only rows (4)

	Key	last_name		email		
	Include	customer_id	source	target	source	target
<input checked="" type="checkbox"/>	1	SMITH	SMITH	MARY.SMITH@sakilacustomer.org	MARY.SMITH@sa	
<input checked="" type="checkbox"/>	4	JONES	JONES	BARBARA.JONES@sakilacustomer.org	BARBARA.JONES	
<input checked="" type="checkbox"/>	5	BROWN	BROWN	ELIZABETH.BROWN@sakilacustomer.org	ELIZA.BROWN@sa	
<input checked="" type="checkbox"/>	6	DAVIS	DAVIS	JENNIFER.DAVIS@sakilacustomer.org	JENNIFER.DAVIS	
<input checked="" type="checkbox"/>	16	MARTIN	MARTIN	SANDRA.MARTIN@sakilacustomer.org	sandra77@gmail.c	
<input checked="" type="checkbox"/>	18	GARCIA	GARCIA	CAROL.GARCIA@sakilacustomer.org	CAROL.GARCIA@	
<input checked="" type="checkbox"/>	21	CLARK	CLARK	MICHELLE.CLARK@sakilacustomer.org	MICHELLE.CLARK	
<input checked="" type="checkbox"/>	23	LEWIS	LEWIS	SARAH.LEWIS@sakilacustomer.org	lewis_moor@gmail	
<input checked="" type="checkbox"/>	25	WALKER	WALKER	DEBORAH.WALKER@sakilacustomer.org	DEBORAH.WALKE	
<input checked="" type="checkbox"/>	27	ALLEN	ALLEN	SHIRLEY.ALLEN@sakilacustomer.org	big_dragon@gmail	
<input checked="" type="checkbox"/>	31	WRIGHT	WRIGHT	BRENDA.WRIGHT@sakilacustomer.org	BRENDA.WRIGHT	
<input checked="" type="checkbox"/>	36	ADAMS	ADAMS	KATHLEEN.ADAMS@sakilacustomer.org	KATHLEEN.ADAMS	

Include all  
Exclude all

### Export results

DB2 Data Sync provides a possibility to save results of data comparison to any of 18 available formats including Excel, HTML, XML, and CSV. Different rows, Source only rows, Target only rows and Identical ones may be saved in separated file of selected formats.

## 5.1 Export comparison results


DB2 Data Sync allows to save results of data comparison to any of 18 available formats including Excel, HTML, XML, and CSV. To invoke the corresponding wizard, use the Export results... button at the right side of [data differences view window](#)<sup>33</sup>.

1. First, select the format of files the comparison report to be saved to.

The screenshot shows the 'Destination format' and 'Output' sections of a wizard. The 'Destination format' section has a title bar and a description: 'Select one of the available destination formats.' It lists several options with radio buttons: 'Microsoft Office Excel 97 - 2003', 'Microsoft Office Excel 2007', 'Delimiter-separated values (CSV, DSV, TSV)', 'Text file (Fixed-width columns)', 'HTML', 'XML', and 'Other'. Below these is a dropdown menu currently showing 'Microsoft Office Word 97 - 2003'. The 'Output' section has a title bar and a description: 'Select or enter the default directory for the result files and specify the default encoding if necessary.' It contains three fields: 'Directory' with the value 'C:\Data\Comparison\_results\' and a browse button (...), 'Default encoding' with a dropdown menu showing 'UTF8', and 'Database name' with the value 'C:\Users\marina.INTERSOFT\Documents\Differences.mdb' and a browse button (...).

2. Select table pairs the report to be generated for and specify file names the report to be saved to.
3. Specify whether the file will contain all according records or only a first specified number.
4. Set the comparison results to be exported: source only rows, target only rows, different rows, or identical ones. For each type of comparison result a separate file will be generated (if the result set is not empty). So if you specified 'sales.xlsx' as the name of file the report to be saved to, select all comparison results and all of them is not empty, four files will be generated at the specified directory:  
*sales\_source\_only.xlsx*  
*sales\_target\_only.xlsx*  
*sales\_modified.xlsx*  
*sales\_identical.xlsx*


**Constraints**

 Specify the number of records to export.

☒ Export all records

☐ Export only first  record(s)

**Datasets to export**

 Select comparison results to be exported


☒ Source only rows

☒ Target only rows

☒ Different rows

☐ Identical rows

**Actions**

 Select actions to be executed after export.

☐ Open files

☐ Print files

## 6 Additional synchronization options

### Synchronization order

Incorrect synchronization order may cause integrity violation and synchronization process will be failed. To avoid such problems, DB2 Data Sync sorts the target tables automatically to avoid potential integrity violations, the ability to change the synchronization order manually is also available.

### Synchronization method

After synchronizing rules have been set and the synchronization process may be started, you have to specify the synchronization method to be used: whether the script generated by DB2 Data Sync will be executed immediately or it will be saved to a file for future use. At least one of these options have to be checked.

### Scripts

There are many cases where the synchronization process is necessary to correct with additional scripts. So to disable table foreign keys before the data modification, specify the corresponding scripts to be executed before and after the process.

### Logging

DB2 Data Sync provides you with a possibility to get a detailed description of all the actions occurred during the synchronization process using a log file.

### Email notifications

To send a log file as an email attachment after data comparison/synchronization is complete (successfully or with error(s)), turn on the appropriate option and specify settings for email(s) to be sent such as target email address(es), SMTP server parameters, subject, body text, etc.

☒ Send E-mail

☒ Always ☐ Only on errors [E-mail settings...](#)

### E-mail settings

Addresses	SMTP settings
From: <input type="text" value="email_from@example.com"/>	Host: <input type="text" value="your_smtp_server.com"/>
Name: <input type="text" value="Email_User_Name"/>	Port: <input type="text" value="25"/> <input checked="" type="checkbox"/> Use Authentication
To: <input type="text" value="email_to@example.com"/>	Username: <input type="text" value="smtp_server_user"/>
Cc: <input type="text"/>	Password: <input type="password" value="••••••••"/>
Bcc: <input type="text"/>	<input type="button" value="Send test e-mail"/>

Subject:




Text:



## 7 Options

DB2 Data Sync allows you to customize the way it works within the [Options](#) dialog. To open the dialog, use the More button and select Options at the drop-down list.



The window allows you to customize the options grouped by the following sections:

- [Application](#)   
General DB2 Data Sync options: rules for auto mapping and data comparison options.
- [Editors & Viewers](#)   
Customizing of all the SQL editors.
- [Appearance](#)   
Customizing program interface - bars, trees, menus, etc.

It is a good idea to check through these settings before you start working with DB2 Data Sync. You may be surprised at all the things you can adjust and configure!

## 7.1 Application

The [Application](#) section allows you to customize common rules of DB2 Data Sync behavior. The section consists of several tab; follow the links to find out more about each of them.

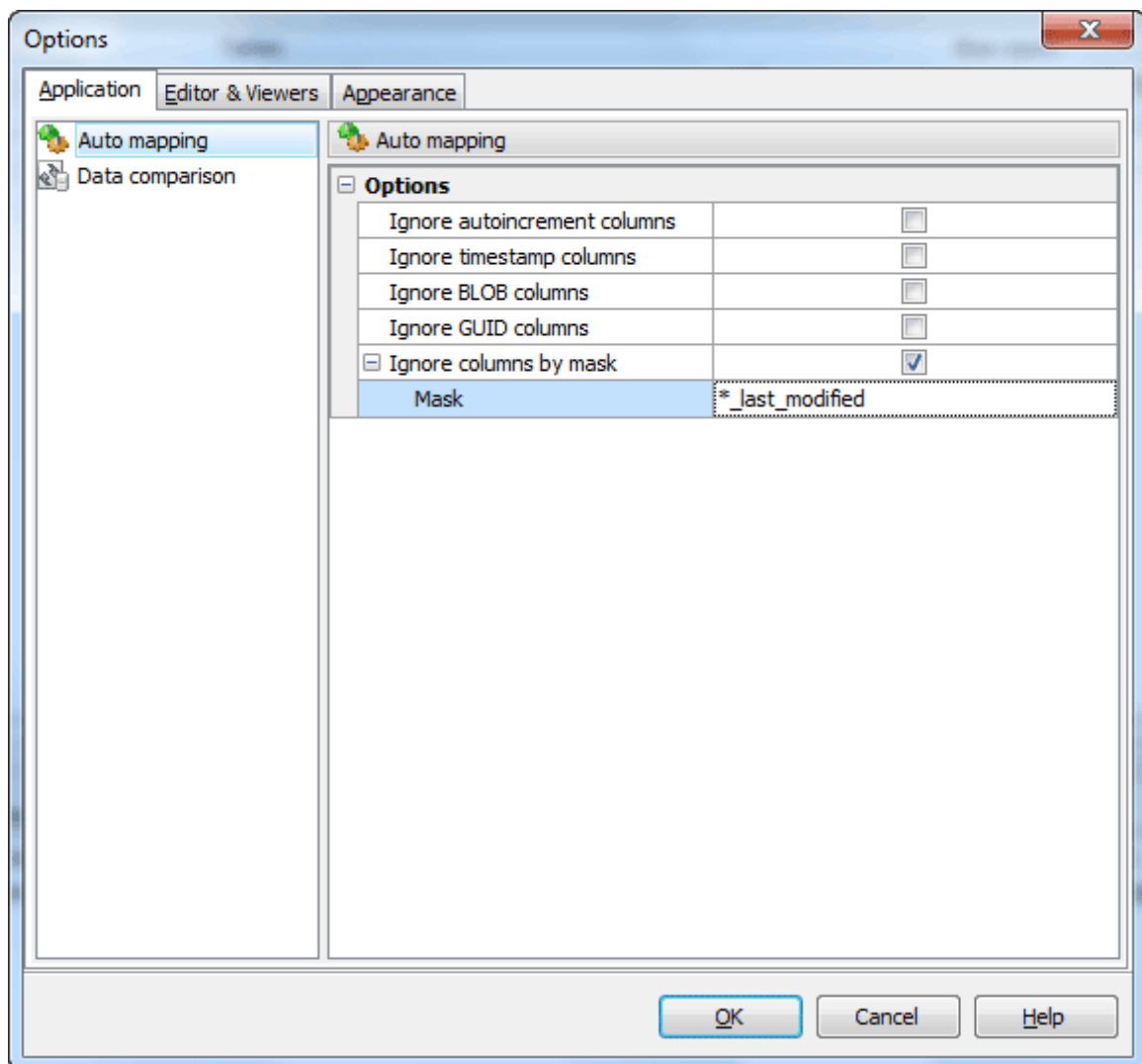
- [Auto mapping](#) 
- [Data comparison](#) 

### 7.1.1 Auto mapping

DB2 Data Sync automatically maps tables with the same names, but you can adjust auto mapping rules more carefully. Check the corresponding boxes to set Data Sync to ignore [autoincrement](#), [timestamp](#), [BLOB](#), and [GUID](#) columns.

#### [Ignore columns by mask](#)

You can also set a mask to for column names to be ignored. Suppose, you have several columns such as `'user_last_modified'`, `'country_last_modified'` and so on, those are not to be synchronized. Specify the mask as follows to ignore these columns on auto mapping.



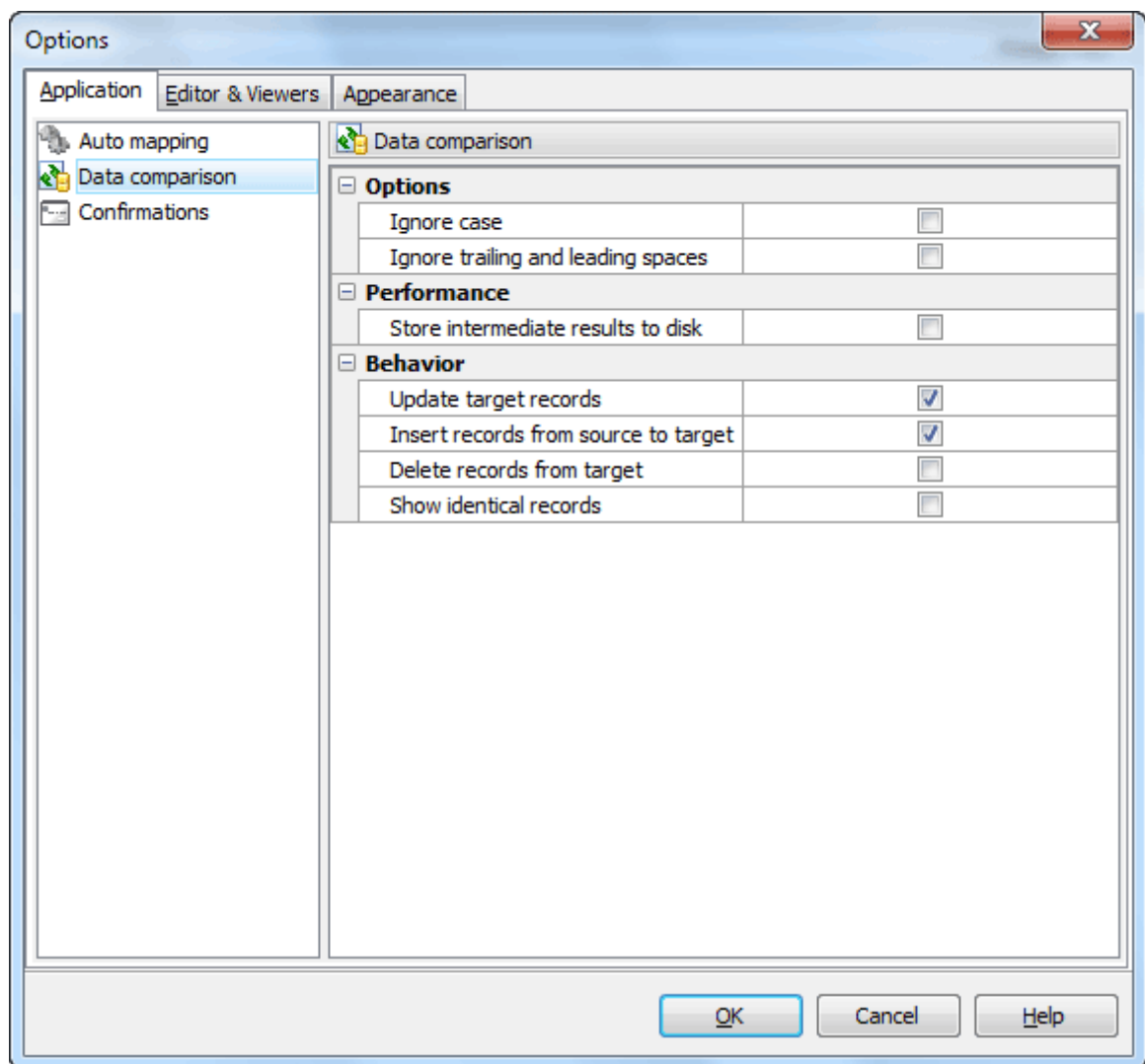
### 7.1.2 Data comparison

Specify here rules to be used for data comparison. Check the corresponding boxes to ignore case, or/and trailing and leading spaces.

If you need to compare large amounts of data it's recommended to turn On the [Store intermediate result on disk](#) option.

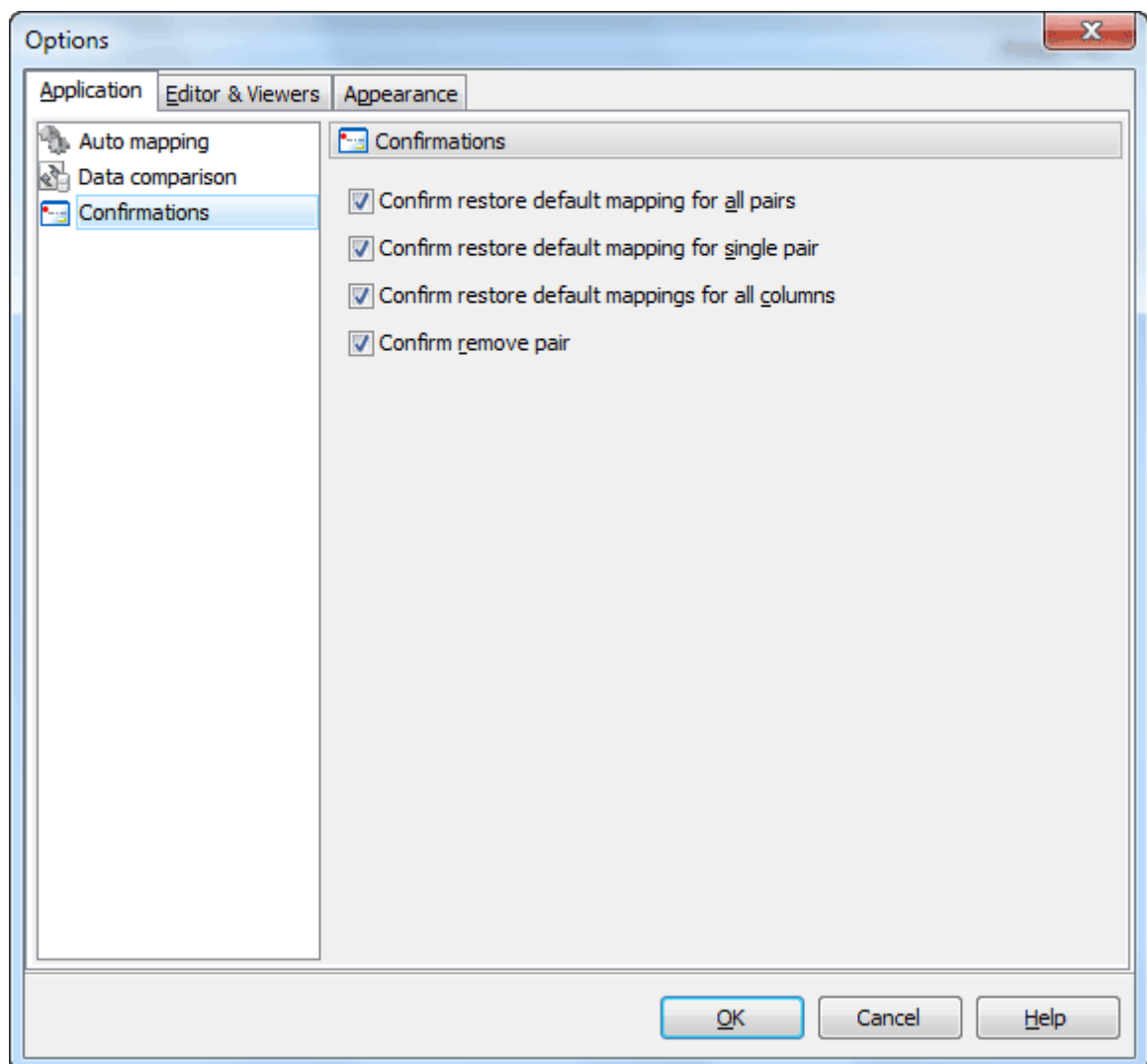
The Behaviour options group allows you to limit the synchronization process by processing only different records (the [Update target records](#) option), or/and rows that exist in the source table but not in the target one (the [Insert records from source to target](#) option), or/and rows that exist in the target table but not in the source one (the [Delete records from target](#) option).

By default, identical records are not displayed in the [Data differences view](#) <sup>33</sup> because the process can take some time, but it's possible to add/exclude the [Identical records](#) tab to the differences display.









### 7.1.3 Confirmations

This tab allows you to disable/enable application confirmations. Most of these options can be also set directly from the corresponding confirmation dialogs.



## 7.2 Editors & Viewers

The [Editors & Viewers](#) section allows you to set the parameters of viewing and editing the SQL statements within DB2 Data Sync.

- [General](#) 
- [Display](#) 
- [SQL highlight](#) 
- [PHP highlight](#) 
- [XML highlight](#) 
- [Code Insight](#) 
- [Code Folding](#) 

### 7.2.1 General

If the [Auto indent](#) option is checked, each new indentation is the same as the previous when editing SQL text.

☒ [Insert mode](#)

If this option is checked, insert symbols mode is default on.

☒ [Use syntax highlight](#)

Enables syntax highlight in the object editor window.

☒ [Always show links](#)

If this option is checked, hyperlinks are displayed in the editor window. To open a link click it with the **Ctrl** button pressed.

☒ [Show line numbers](#)

If this option is checked, line numbers are displayed in the editor window.

☒ [Show special chars](#)

If this option is checked, special chars (like line breaks) are displayed in the editor window.

☒ [Use smart tabs](#)

With this option on the number of tab stops is calculated automatically, depending on the previous line tab.

☒ [Convert tabs to spaces](#)

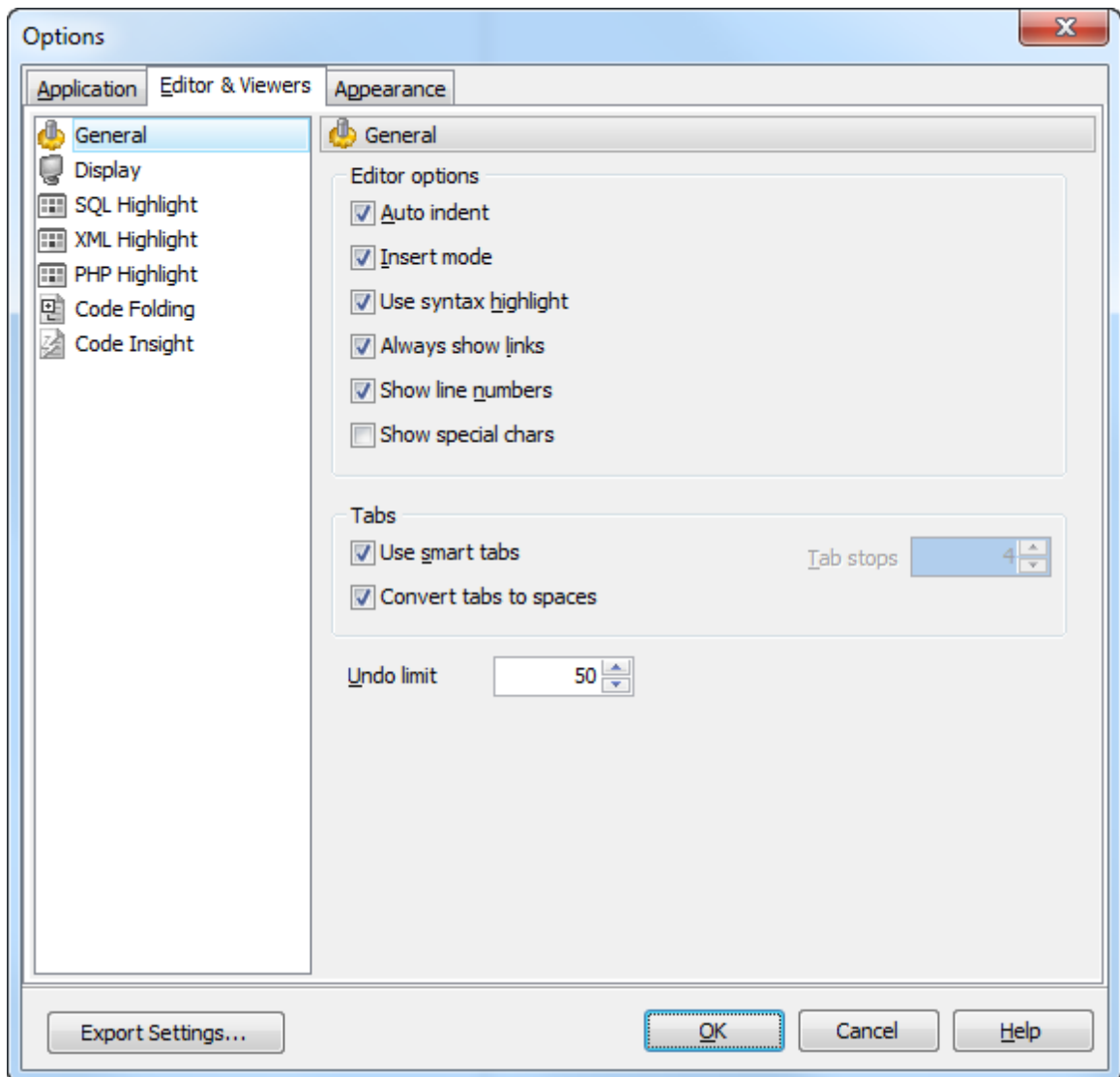
If this option is checked, each time you press the Tab key, the appropriate number of spaces will be added to the edited text.

[Tab Stops](#)

Defines the tab length, used when editing text.

[Undo Limit](#)

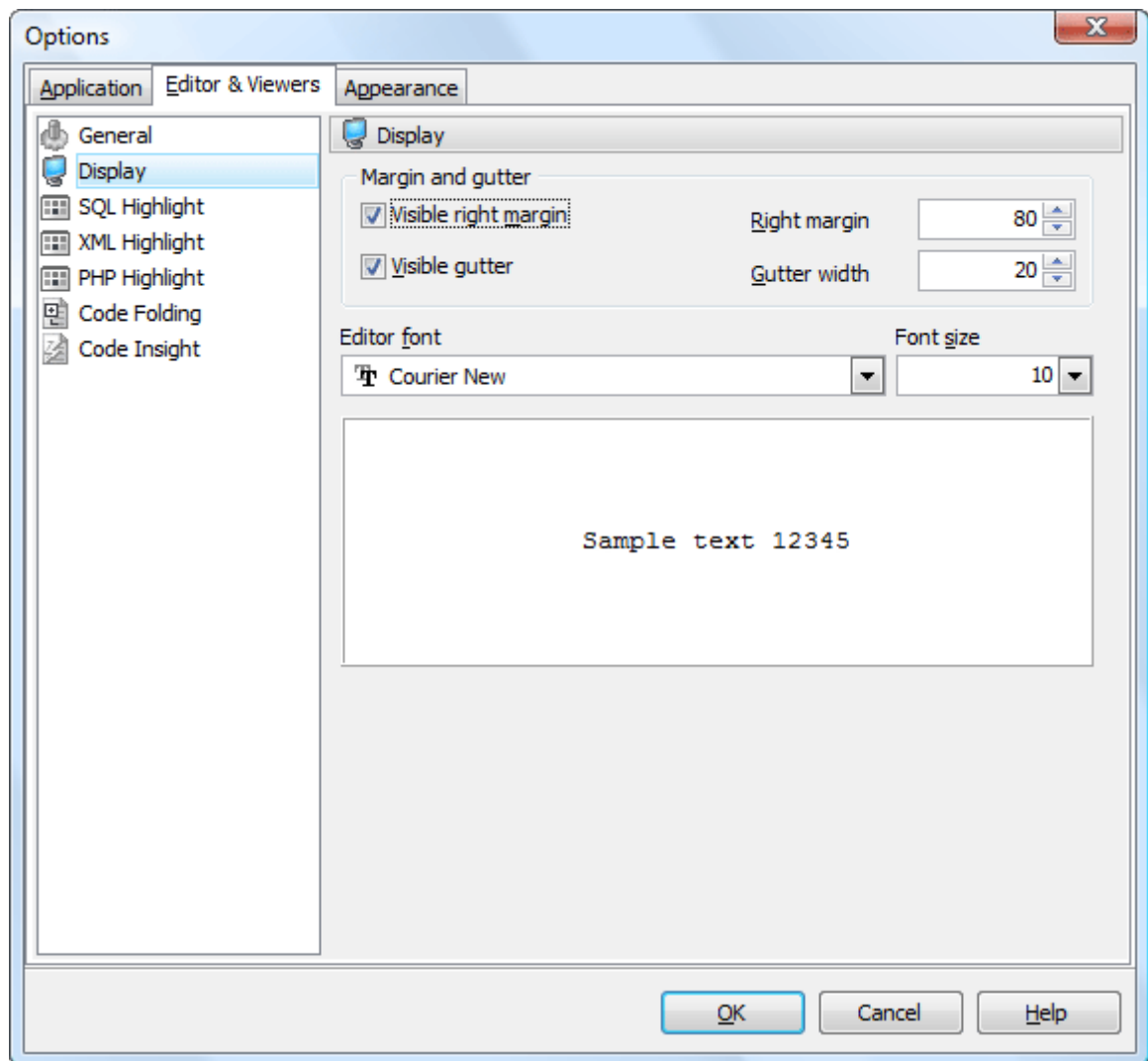
Defines the maximum number of changes possible to be undone.



## 7.2.2 Display

You can disable/enable the right text margin and the gutter of the editor area, set the position of the right text margin as [Right margin](#), and [the Gutter width](#).

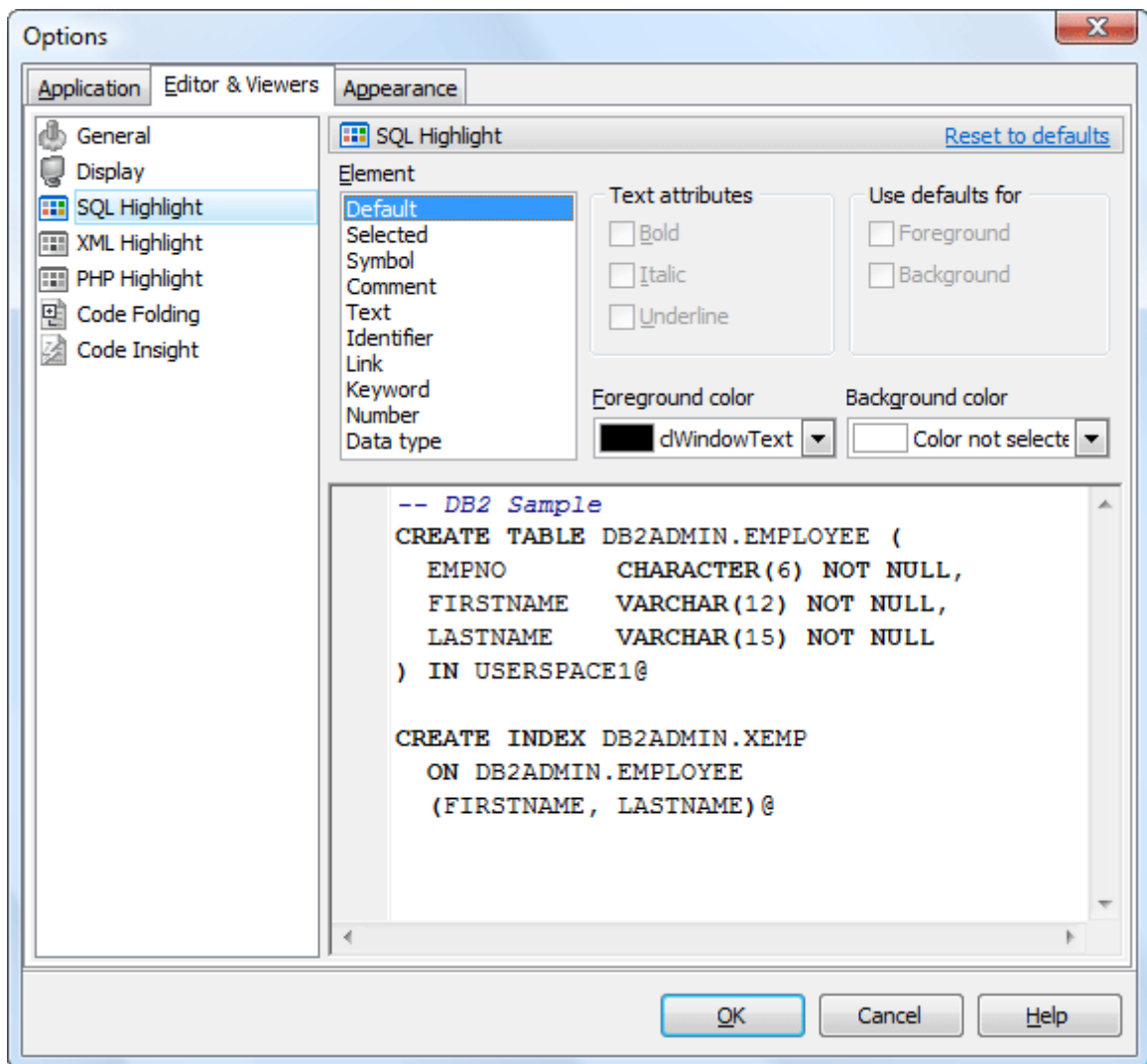
Use the [Editor font](#) and [Font size](#) to define the font used in all program editors and viewers. The panel below displays the sample of the selected font.



### 7.2.3 SQL highlight

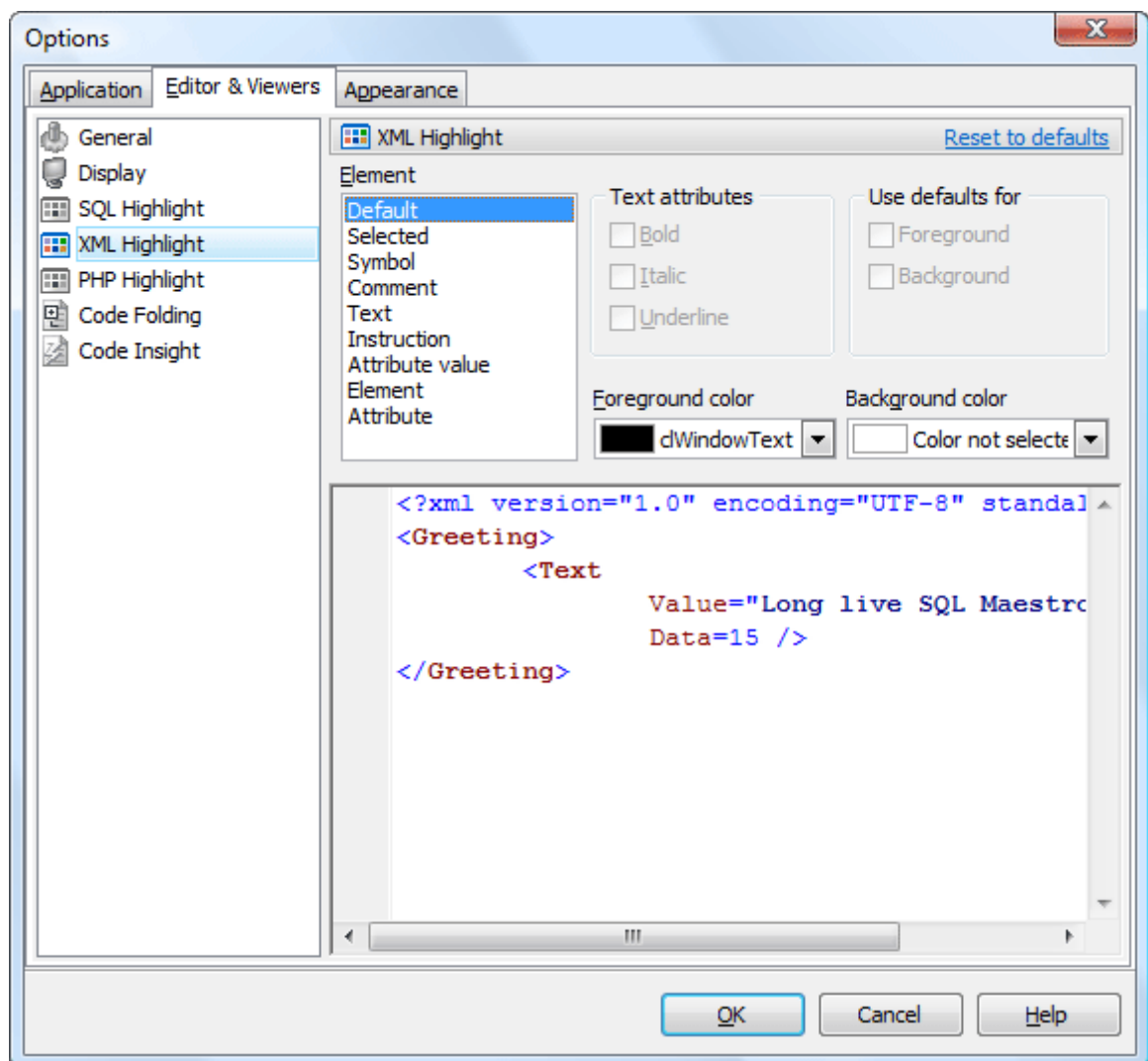
Use the [SQL highlight](#) item to customize syntax highlight in all SQL editors and viewers. Select the text element from the list, e.g. *comment* or *SQL keyword* and adjust its foreground color, background color and text attributes according to your preferences.





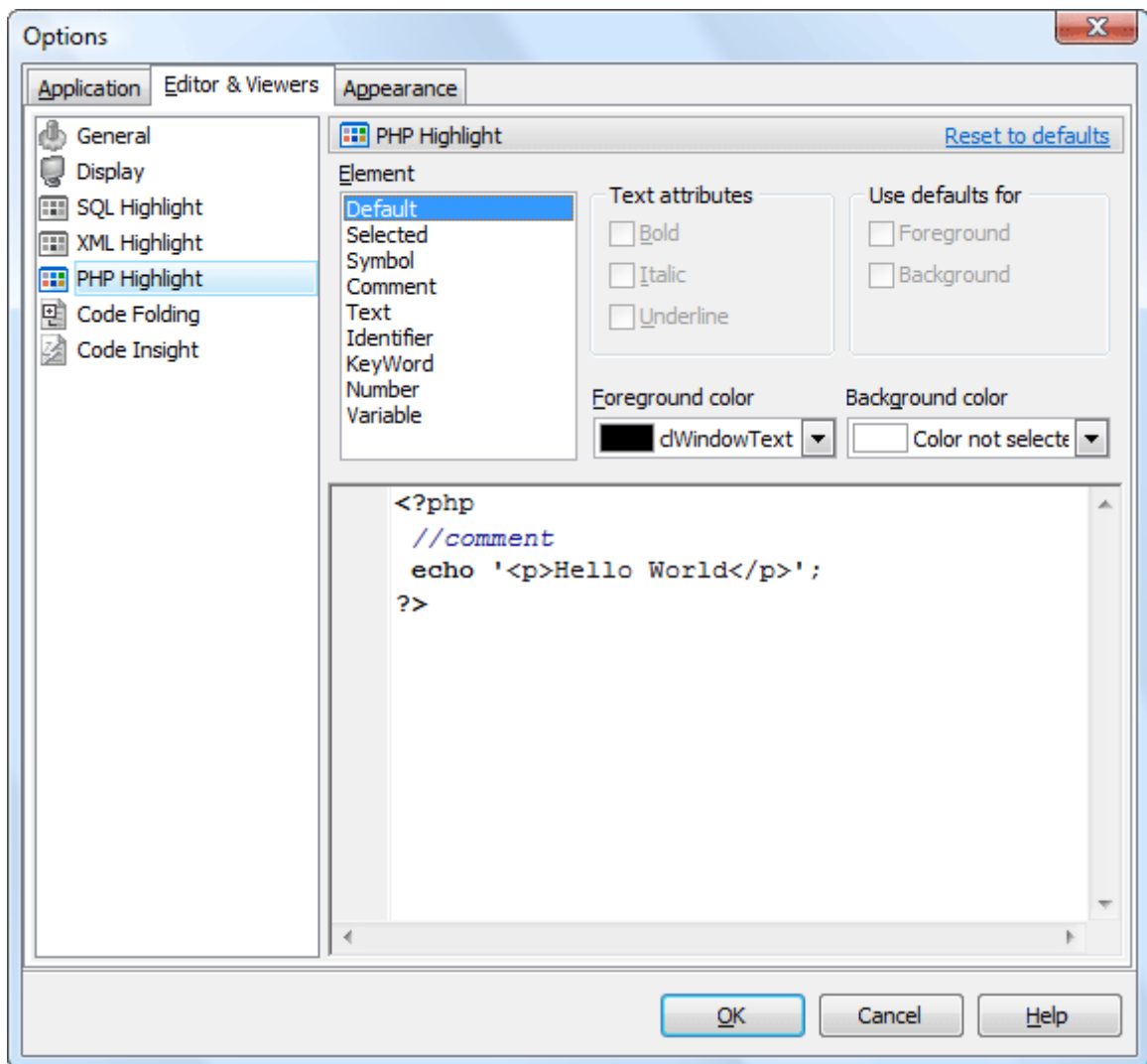
## 7.2.4 XML highlight

Use the [XML highlight](#) item to customize XML syntax highlight for the text representation of BLOBs. Select the text element from the list, e.g. attribute or attribute value and adjust its foreground color, background color and text attributes according to your wishes.



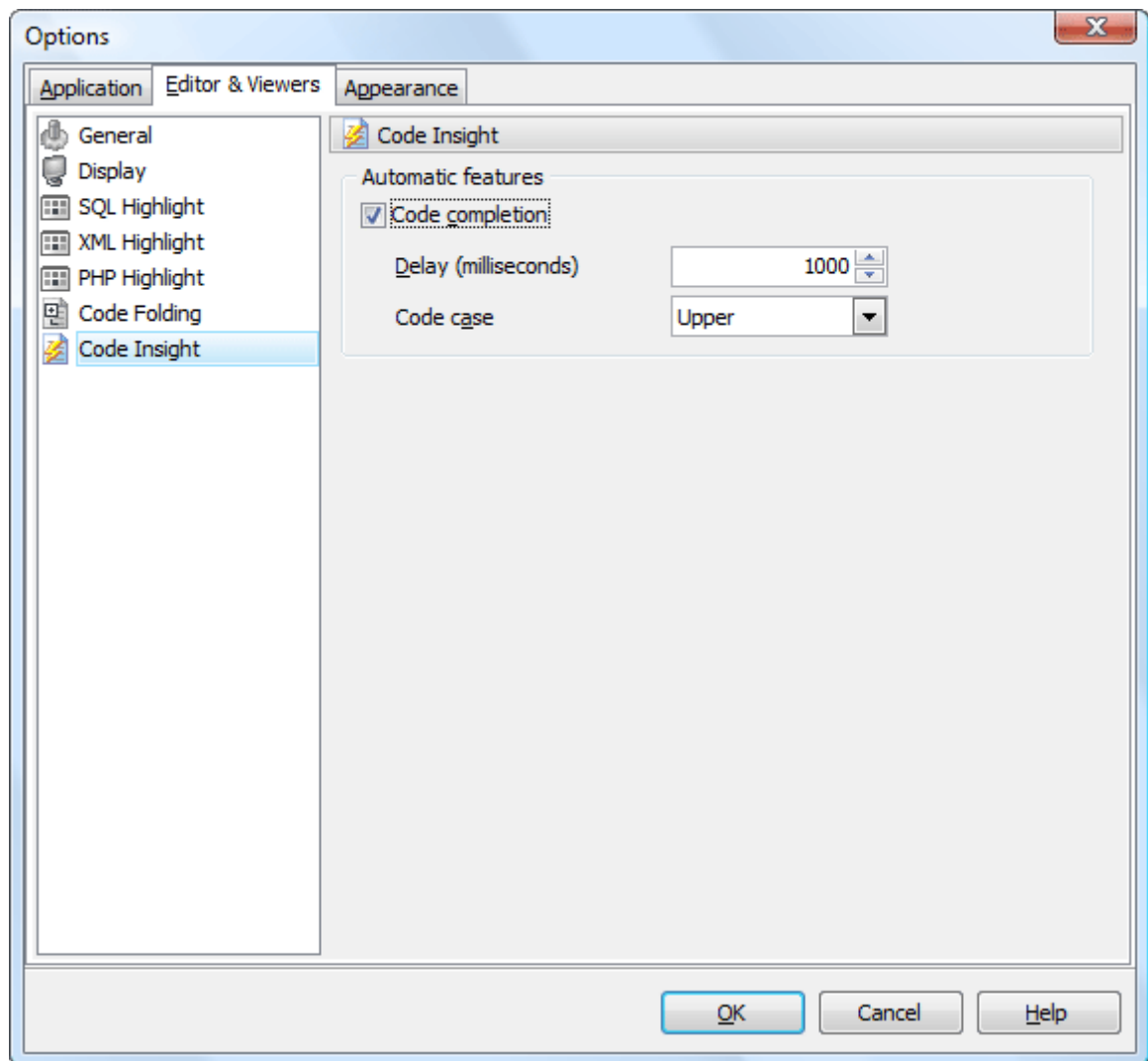
### 7.2.5 PHP highlight

Select the text element from the list (e.g. Keyword, Comment, Identifier), and adjust its foreground color, background color and text attributes according to your wishes.



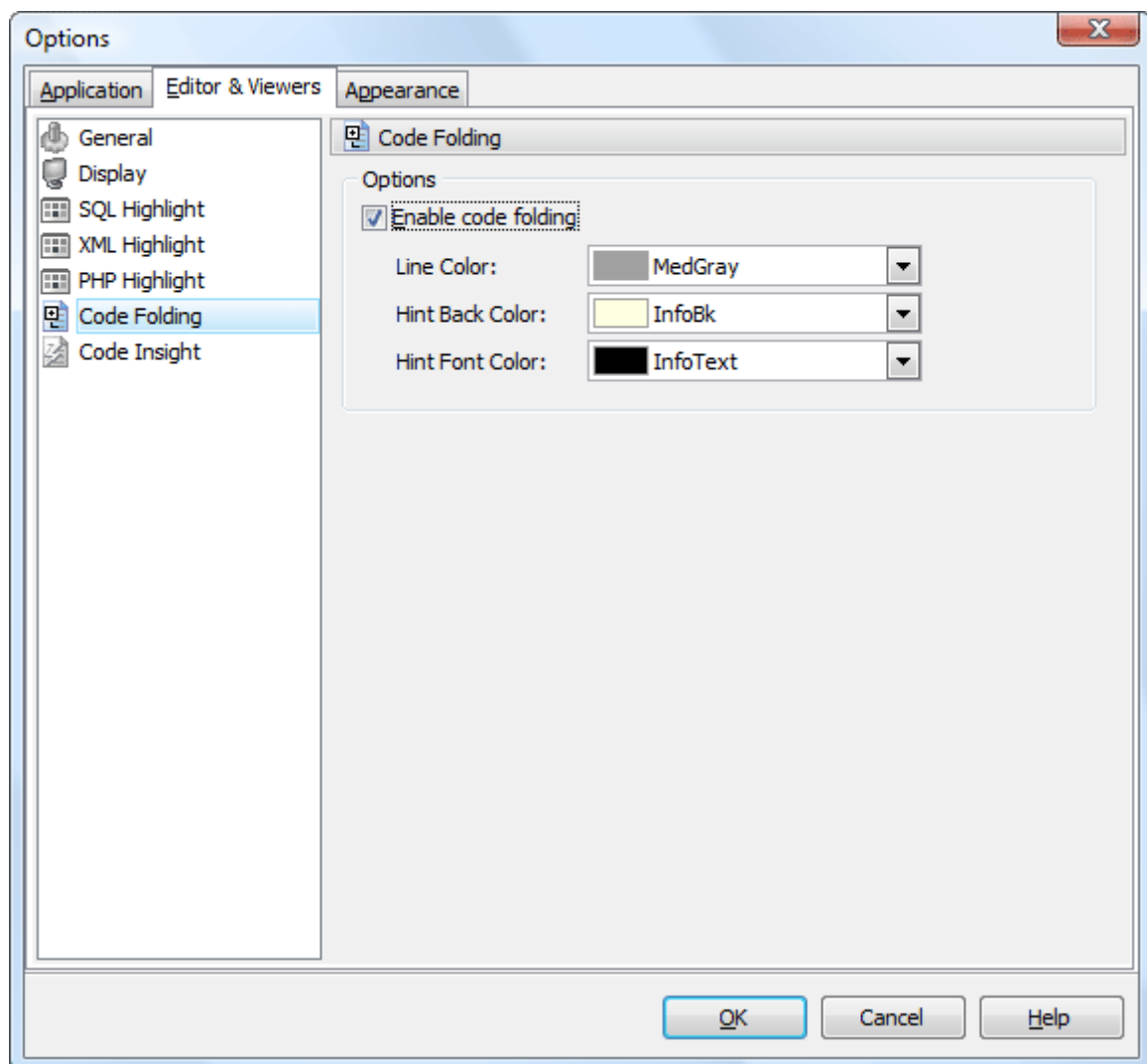
### 7.2.6 Code Insight

You can disable/enable the code completion with the corresponding option and also set the time it appears as *Delay*, and case of words inserted automatically.



### 7.2.7 Code Folding

The [Code Folding](#) item group makes it possible both to view the whole text and to divide it into logical parts (regions). Each part can be collapsed and extended. In extended mode the whole text is displayed (set by default), in collapsed mode the text is hidden behind one text line denoting the first line of the collapsed region.



You can enable/disable code folding in SQL editors and viewers and customize the colors of its items.

## 7.3 Appearance

The [Appearance](#) section allows you to customize the application interface style to your preferences.

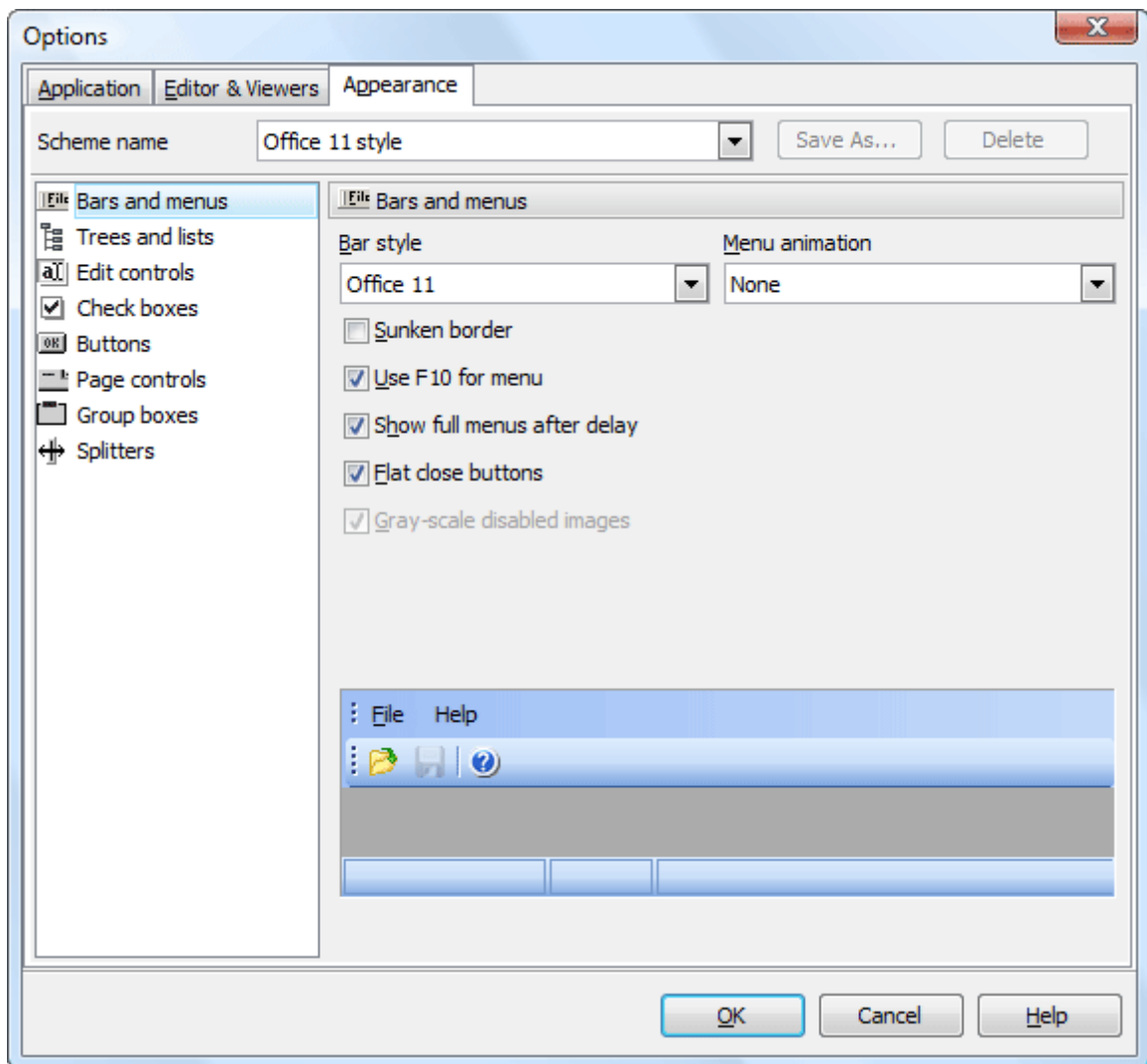
Use the [Scheme name](#) box to select the interface scheme you prefer: *Office XP style*, *Windows XP native style*, etc. You can create your own interface schemes by customizing any visual options ([Bars and menus](#), [Trees and lists](#), [Edit controls](#), [Check boxes](#), [Buttons](#), etc.) and clicking the [Save As](#) button. All the customized options are displayed on the sample panel.

- [Bars and menus](#) 
- [Trees and lists](#) 
- [Edit controls](#) 
- [Check boxes](#) 
- [Buttons](#) 
- [Page controls](#) 
- [Group boxes](#) 
- [Splitters](#) 

### 7.3.1 Bars and menus

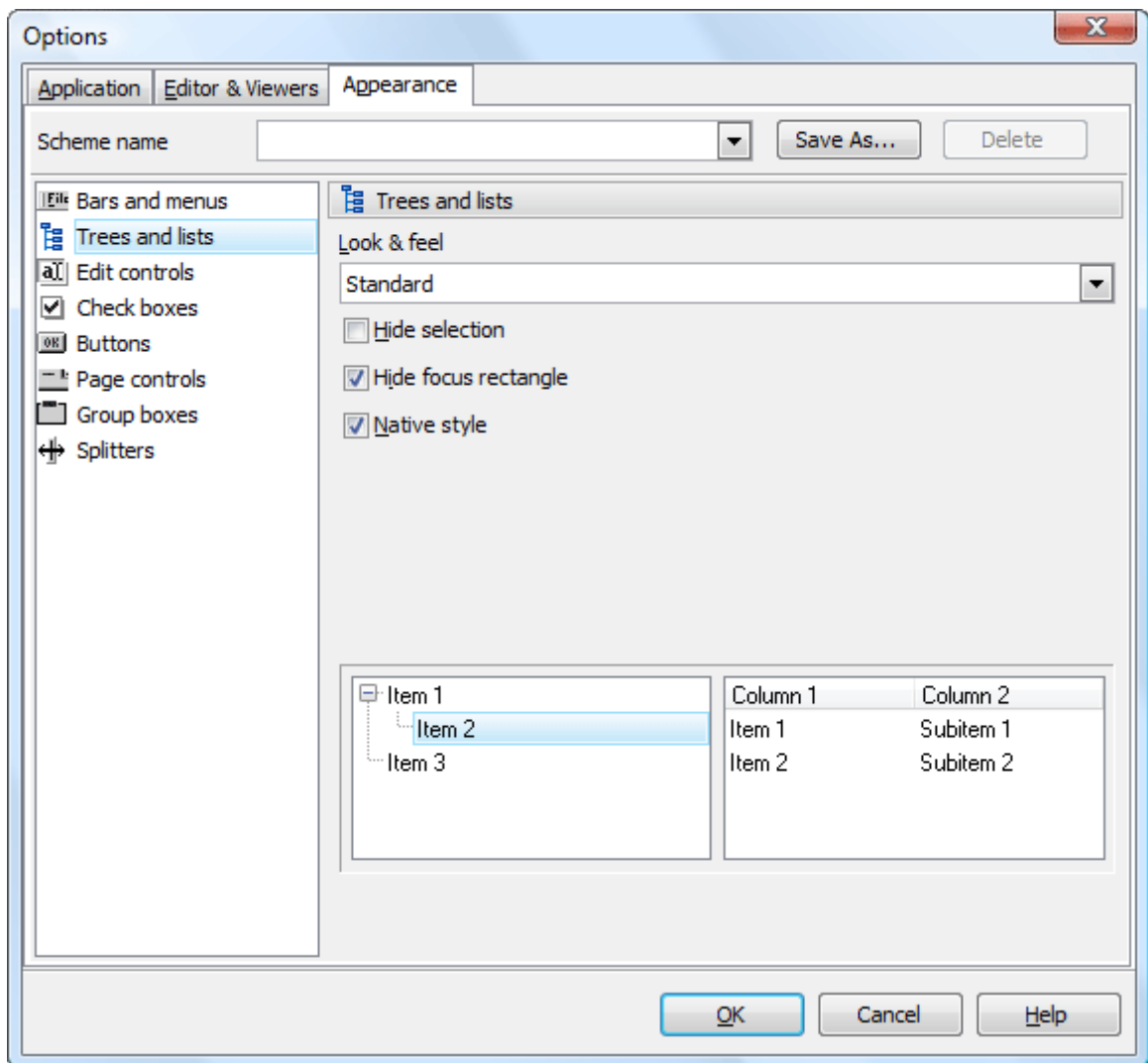
Use the [Bars and menus](#) item to customize DB2 Data Sync toolbars style and menus animation.

The item allows you to select Bar style and menu animation from the corresponding drop-down lists and to enable or disable such options as sunken border, F10 key for opening menu, viewing full menus after delay, flat close buttons, gray-scale images.



### 7.3.2 Trees and lists

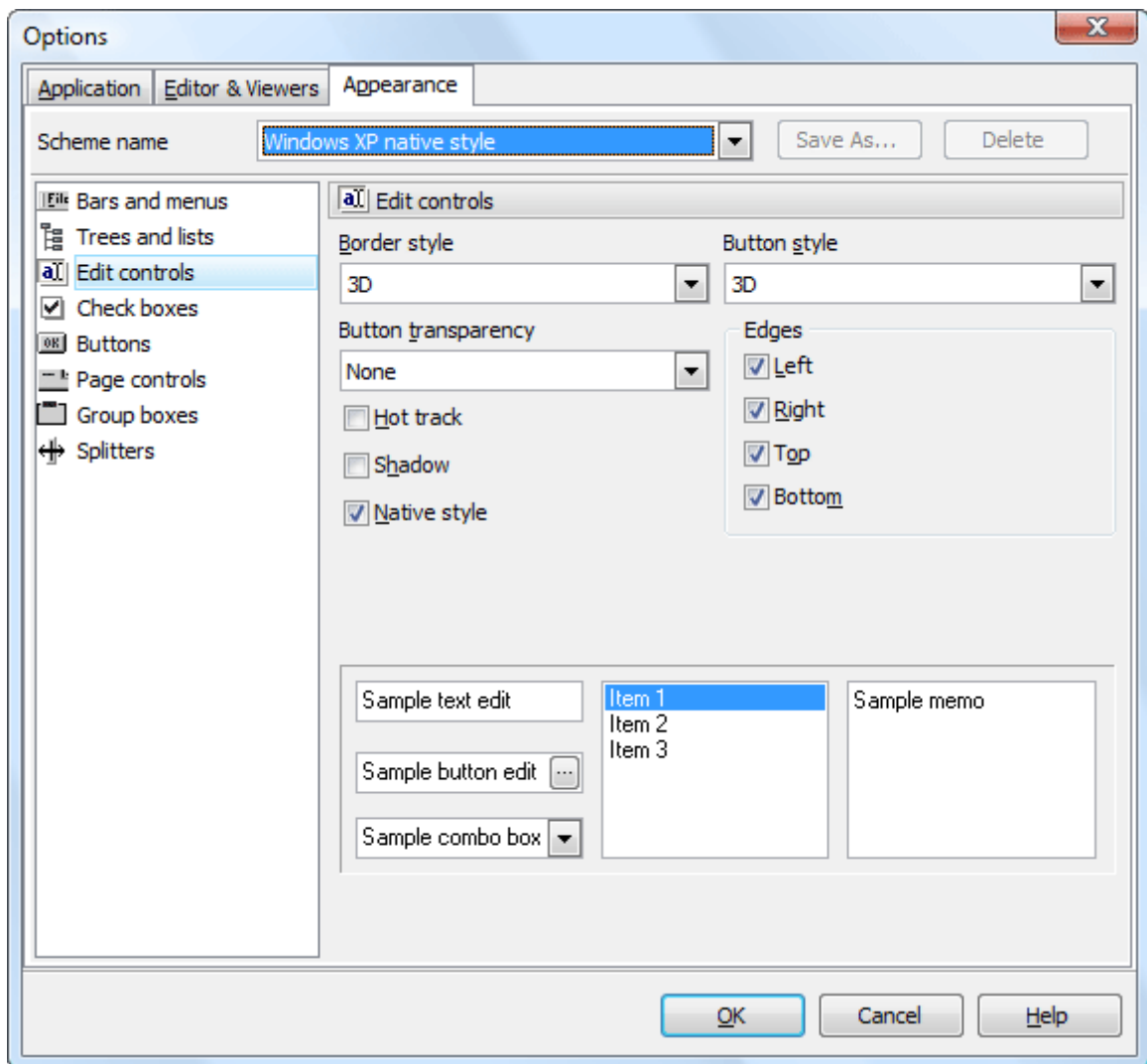
Use the **Trees and lists** item to select various tree view options. Use the item to select *standard*, *flat* or *ultraflat* styles, check or uncheck the *hide selection*, *hide focus rectangle* and *native style* options.



### 7.3.3 Edit controls

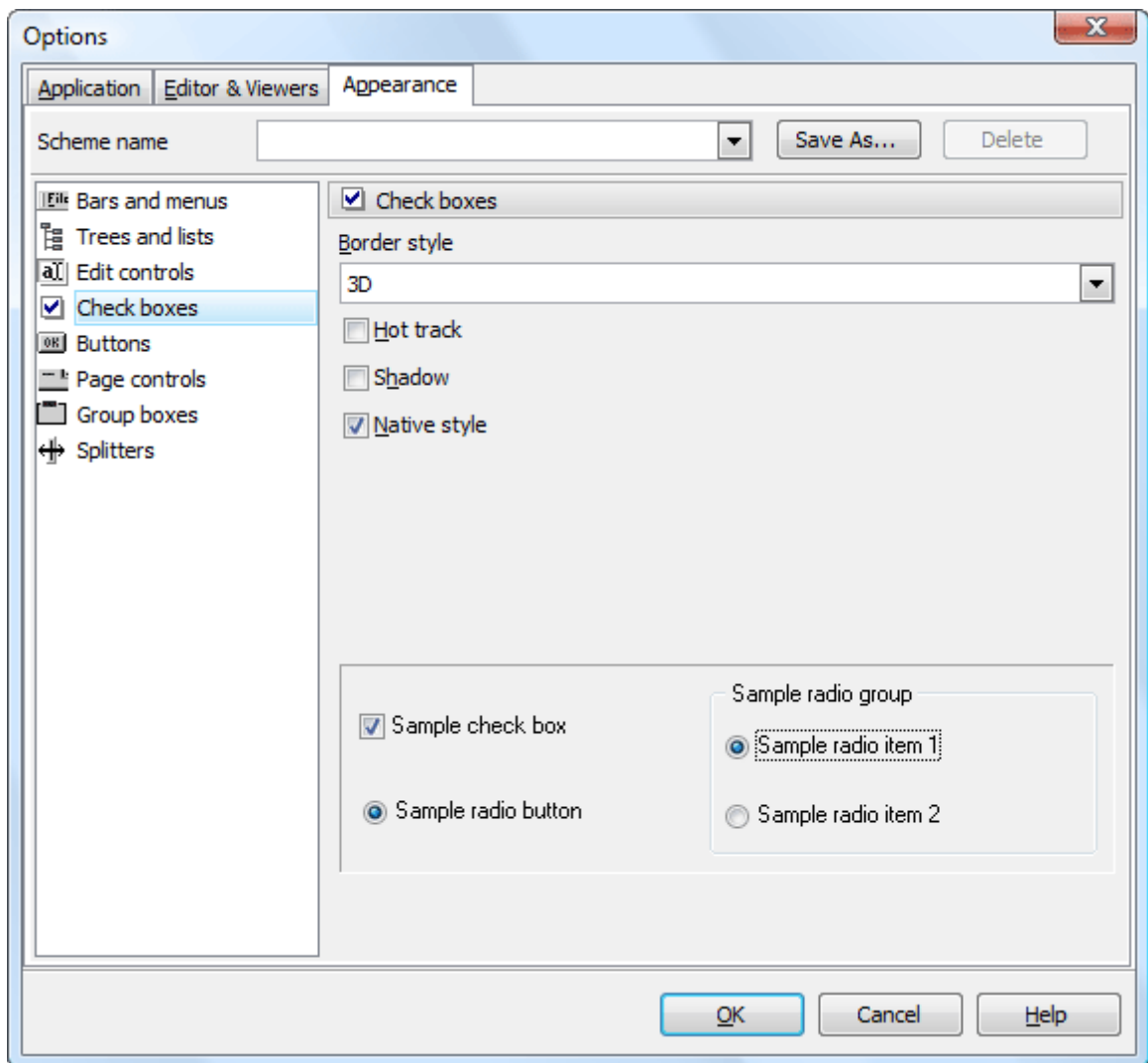
Use the [Edit controls](#) item to customize the appearance of different DB2 Data Sync edit controls. The tab allows you to select the edit controls border style, button style and transparency, enable/disable hot tracks, shadows, native style and customize edges. It is also possible to define samples for the text edit, button edit and combo box controls.





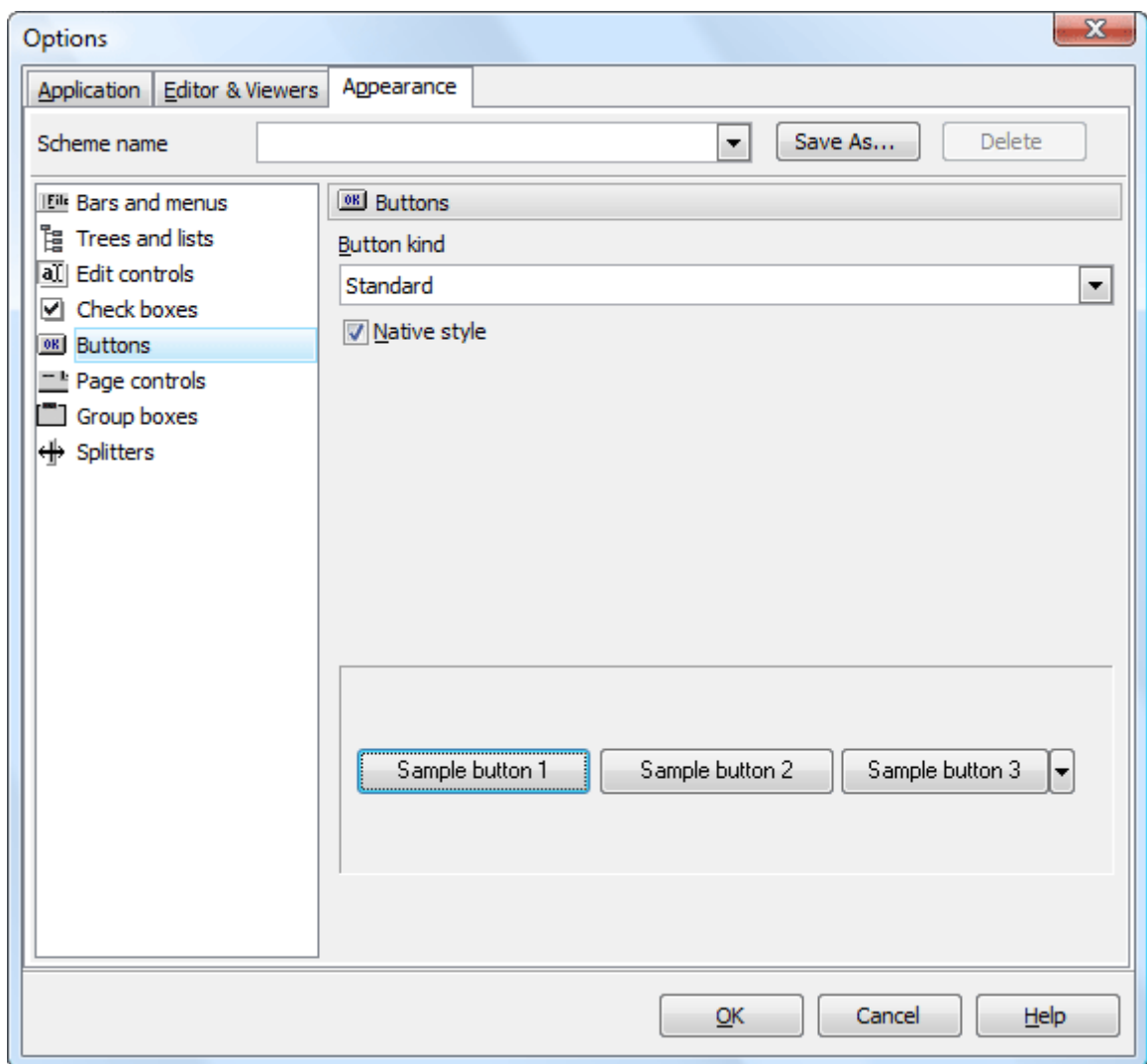
### 7.3.4 Check boxes

The [Check boxes](#) item allows you to customize the appearance of check boxes and radio buttons. The tab allows you to customize the appearance of check boxes: set border style, enable/disable hot tracks, shadows, native style. It is also possible to define samples for check boxes and radio buttons.



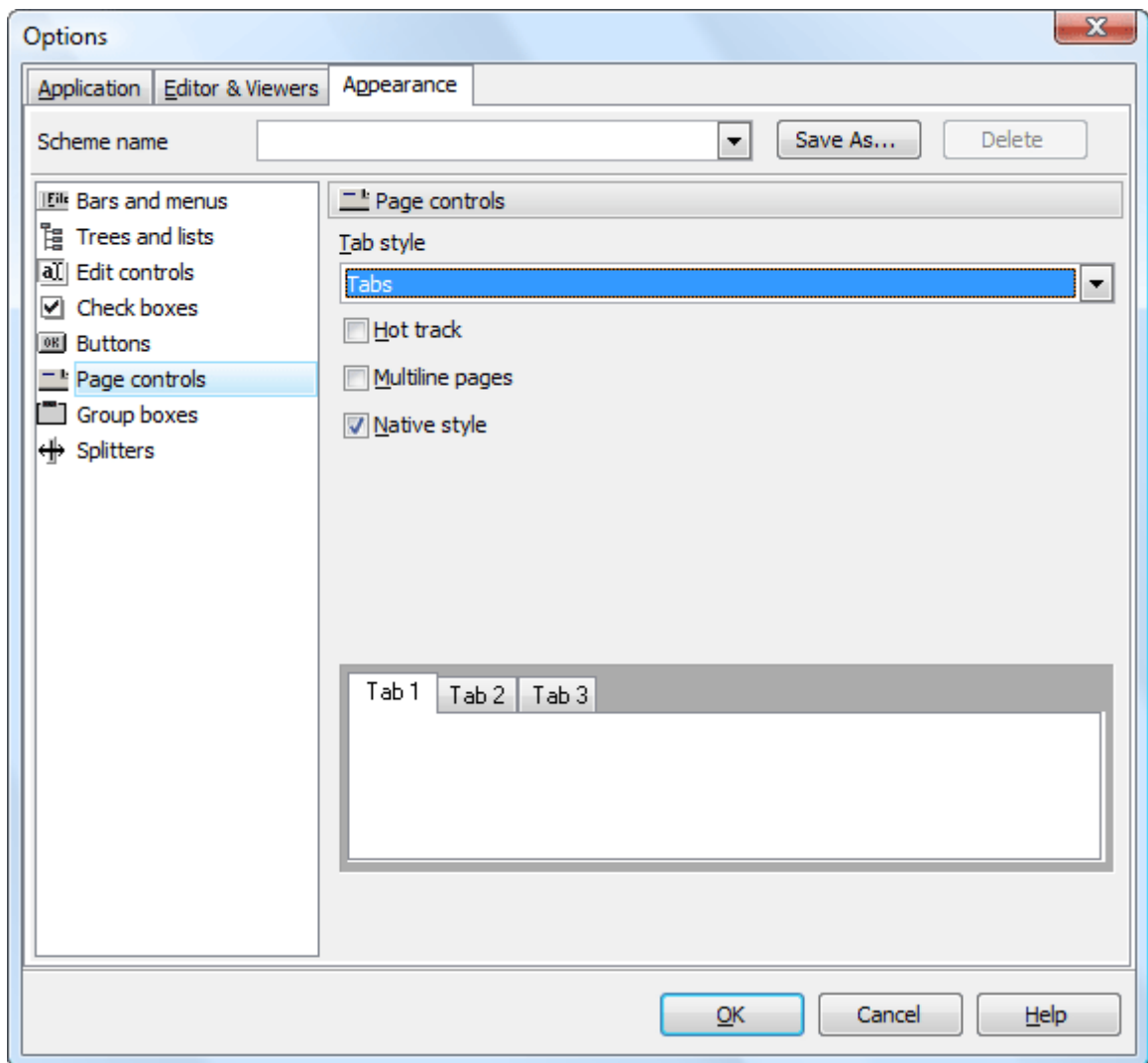
### 7.3.5 Buttons

Use the [Buttons](#) item to customize DB2 Data Sync buttons. The tab allows you to adjust the appearance of buttons and define sample buttons as well.



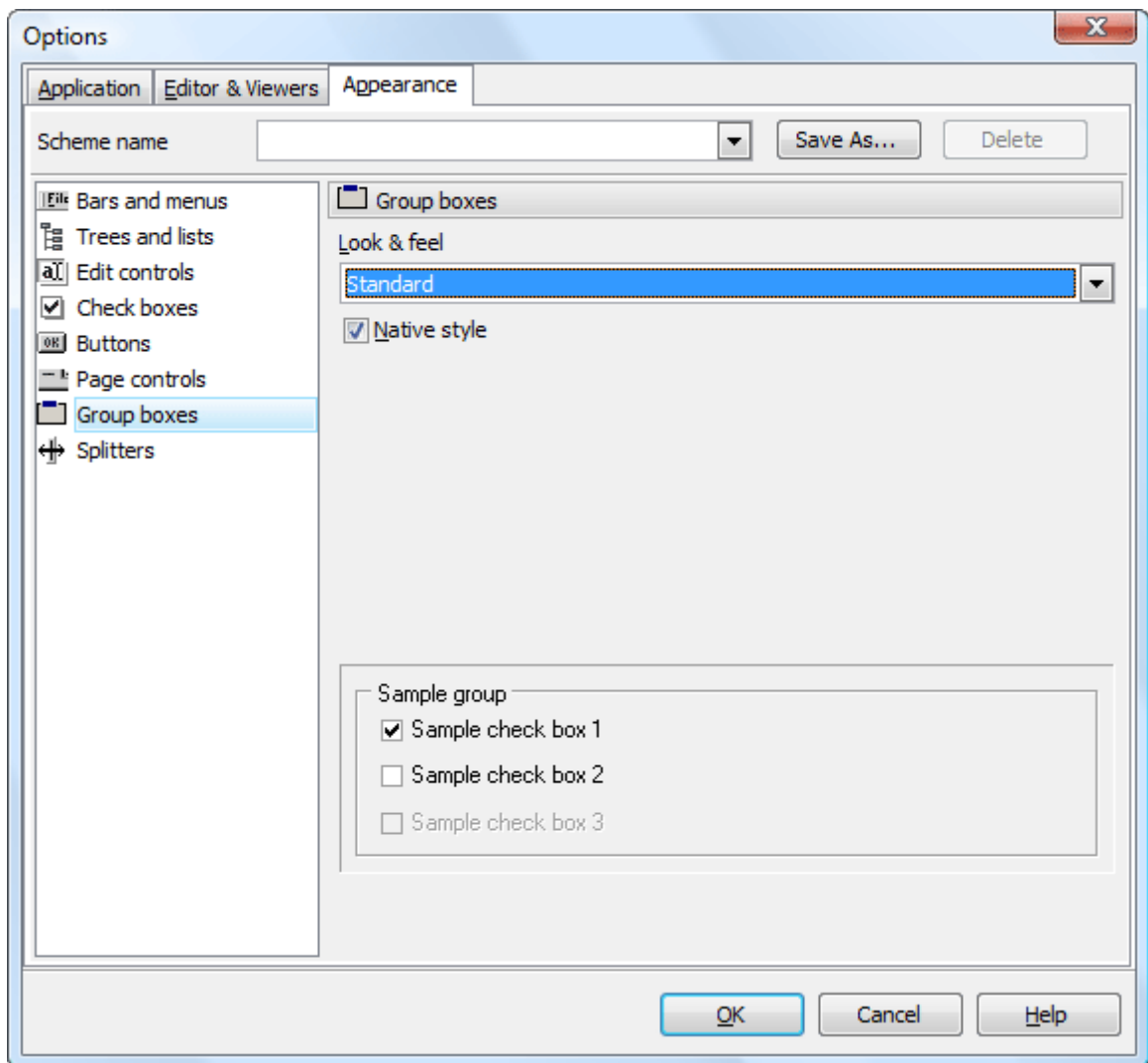
### 7.3.6 Page controls

The [Page controls](#) item allows you to customize the style of all DB2 Data Sync page controls. The tab allows you to select tab styles, enable/disable hot track, multi-line pages and native style.



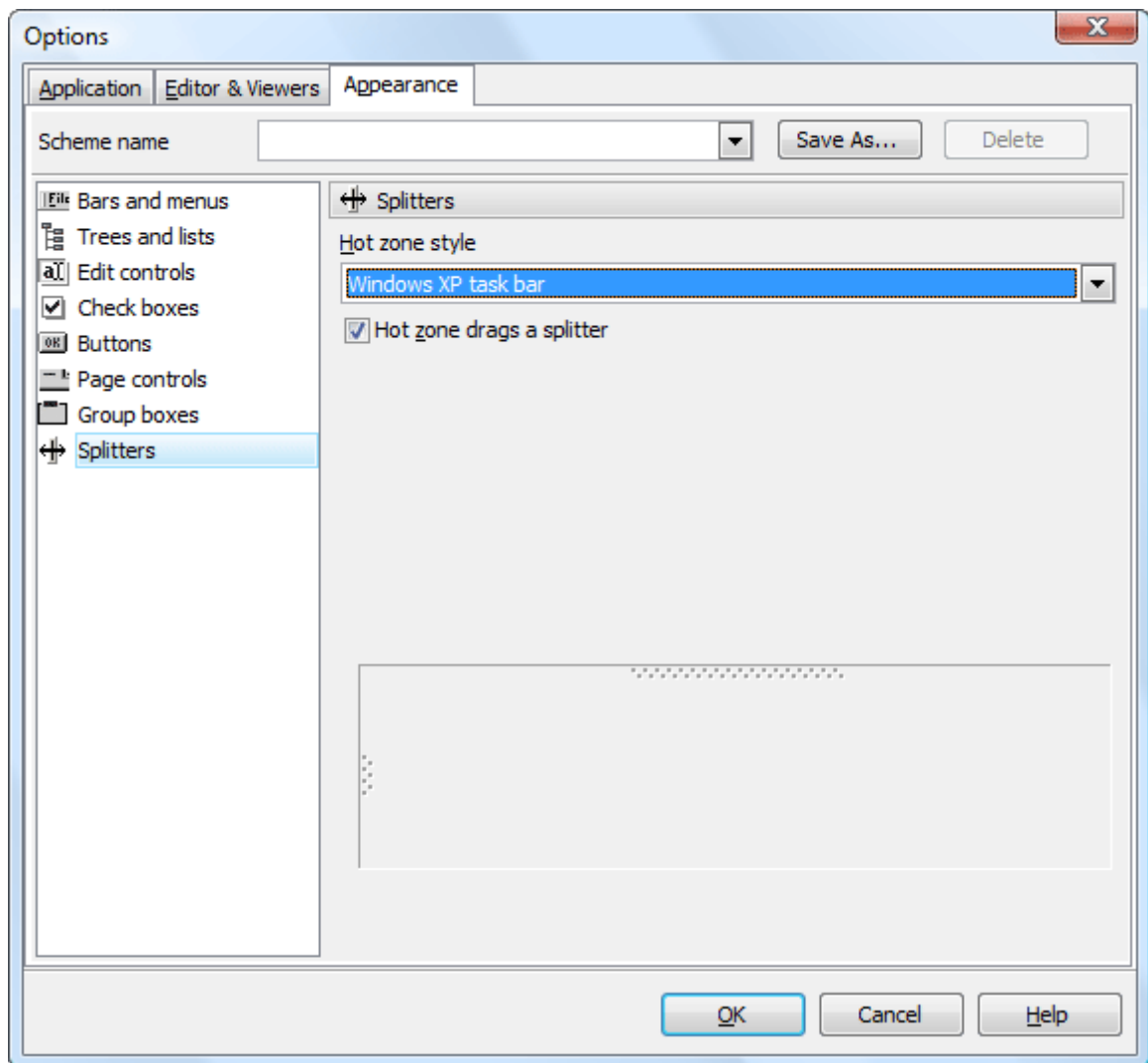
### 7.3.7 Group boxes

Use the [Group boxes](#) item to customize all DB2 Data Sync group boxes according to your preferences. Use tab to apply styles for group boxes, enable/disable native style and define samples.



### 7.3.8 Splitters

Use the [Splitters](#) item to customize all DB2 Data Sync splitters according to your preferences. Use the tab to select hot zone style (*Windows XP task bar*, *Media Player 8*, *Media Player 9*, *Simple* or *none*) and specify the [Hot zone drags a splitter](#) option.



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